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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

June 2002

Data Assimilation
Meteorological Office
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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Mesoscale Data Assimilation and Observational Monitoring
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.
N.B. The sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.

TABLE I

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for ships, fixed buoys and platforms.

Standard of comparison :Background field from UKMO global model.

Observation times :00, 06, 12, 18 UTC

Elements monitored :Mean sea level pressure (hPa).
:Wind speed (m s^{-1}).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT :15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

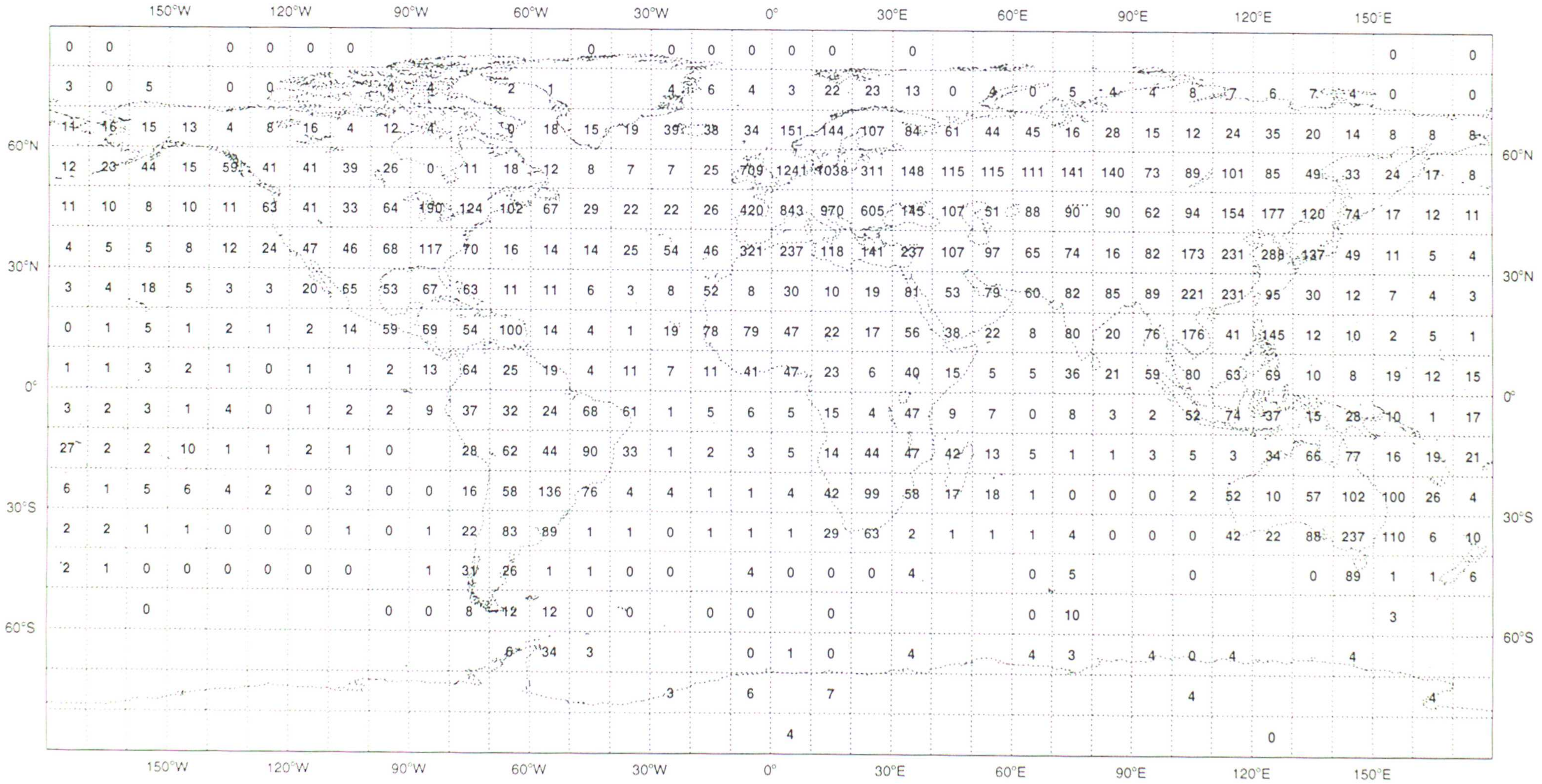
1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
BBXX KS0	P	418	0	100	3.4	6.6	7.5
C6FE6	P	39	0	0	2.1	5.8	6.1
DPCK	P	50	0	96	1.7	-5.1	5.3
ELZF7	P	32	0	0	0.9	6.5	6.6
KS000	P	161	0	100	1.0	11.7	11.8
KS003	P	27	0	100	0.7	5.9	5.9
KS006	P	195	0	61	0.5	7.4	7.5
KS010	P	69	0	39	0.5	4.2	4.2
KS012	P	119	0	78	1.2	5.9	6.0
KS013	P	51	0	88	0.4	4.9	4.9
OWDD	P	31	0	39	1.4	-4.3	4.5
P3FZ6	P	21	0	5	1.8	6.3	6.5
UCTS	P	57	2	95	3.2	-9.6	10.1
UFAA	P	24	0	100	1.1	9.4	9.4
UIAG	P	25	0	92	1.6	-5.5	5.7
VGFQ	P	47	32	100	3.2	-5.2	6.1
VGJC	P	27	67	96	5.6	-3.2	6.5
V7AP7	P	23	0	22	3.6	-4.3	5.6
V7BX5	P	20	0	65	0.9	-4.2	4.3
WAZ9548	P	23	0	30	2.1	4.1	4.6
XXAN	P	39	0	54	1.3	4.1	4.3
YCTJ	P	67	66	73	5.2	3.1	6.1
62142	P	156	29	92	9.2	2.2	9.5
WIND SPEED							
BBXX KS0	SPEED	241	0	100	2.0	-5.3	5.7
C6OM8	SPEED	45	4	22	6.4	6.7	9.3
ELRR4	SPEED	57	0	5	1.8	5.5	5.8
ELXT8	SPEED	20	5	100	8.5	8.2	11.8
ELYB2	SPEED	75	0	15	3.9	5.6	6.9
HP6038	SPEED	235	0	1	3.4	5.3	6.3
KS006	SPEED	191	0	38	1.4	-5.6	5.7
KS007	SPEED	179	0	0	2.2	-5.1	5.6
KS010	SPEED	69	0	0	1.1	-5.0	5.1
KS013	SPEED	50	0	0	1.5	-7.1	7.2
OWVI2	SPEED	26	0	8	4.2	5.1	6.6
PPSO	SPEED	24	0	100	5.5	8.2	9.9
VRWE9	SPEED	23	0	57	5.4	9.2	10.7
ZCAN3	SPEED	24	33	83	9.2	2.9	9.7
ZCBW2	SPEED	35	0	14	2.3	5.0	5.5
3FMM6	SPEED	44	0	50	5.5	10.9	12.2
44145	SPEED	234	0	10	5.2	6.5	8.3
WIND DIRECTION							
FNWX	DIRN.	32	0	0	21.9	-30.4	37.5
51023	DIRN.	27	0	0	43.2	36.2	56.4
52007	DIRN.	53	0	0	27.6	-37.4	46.5
62131	DIRN.	54	0	0	10.3	30.2	31.9
SEA SURFACE TEMPERATURE							
CGDX	SST	79	99	99	0.0	2.0	2.0
CG2960	SST	192	9	100	2.2	3.4	4.1
CG8048	SST	52	100	100			
C6MS4	SST	41	7	100	1.1	-4.3	4.5
C6QO9	SST	37	0	100	1.5	4.7	5.0
DBBI	SST	562	28	28	0.5	0.9	1.1
DGNB	SST	661	45	48	2.0	1.1	2.3
ELOX9	SST	27	44	44	0.8	0.5	0.9
ELXT8	SST	21	10	100	0.6	-3.4	3.4
FNYF	SST	105	0	60	3.6	3.5	5.0

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
SEA SURFACE TEMPERATURE							
H9IM	SST	24	0	100	1.6	3.5	3.9
H9RS	SST	51	0	100	0.9	6.9	7.0
J8JW7	SST	59	0	100	1.2	3.2	3.4
KS000	SST	155	36	46	1.9	1.5	2.4
KS003	SST	28	36	100	0.7	-3.7	3.8
KS013	SST	52	2	12	0.6	-3.1	3.2
LF5T	SST	151	44	44	0.6	-0.1	0.6
MZIF7	SST	26	0	85	1.1	-5.2	5.3
MZIM8	SST	20	0	20	1.5	-3.0	3.4
PIAN	SST	58	0	29	0.8	3.0	3.1
PJOX	SST	64	0	100	2.0	-4.0	4.5
UASU	SST	20	0	25	0.6	-3.4	3.5
UCOY	SST	22	5	50	1.4	3.8	4.0
VGFQ	SST	37	27	35	2.3	0.6	2.4
VGLZ	SST	37	86	100	0.5	1.3	1.4
VGNW	SST	41	27	76	2.3	2.0	3.1
VGPY	SST	20	25	25	1.3	0.8	1.5
VOCJ	SST	231	0	100	1.6	3.6	3.9
V2IA1	SST	20	0	85	1.6	-4.9	5.1
YJQL3	SST	45	0	100	0.9	-4.9	5.0
3ECM7	SST	91	0	100	1.1	3.7	3.9
3FDO6	SST	82	0	100	1.9	3.4	3.9
3FDZ5	SST	37	0	100	1.1	3.2	3.4
3FKD6	SST	70	14	67	4.2	-4.3	6.0
3FMM6	SST	44	0	52	0.5	-4.0	4.0
3FRR5	SST	55	0	62	0.6	3.0	3.1
45140	SST	204	100	100			
45144	SST	56	0	100	0.2	5.3	5.3
45145	SST	256	100	100			
45147	SST	641	100	100			
45148	SST	334	100	100			
45151	SST	682	0	97	1.2	4.5	4.7
45152	SST	686	100	100			
45154	SST	691	0	67	1.7	3.6	4.0
46131	SST	493	100	100			
46146	SST	175	100	100			
46181	SST	685	100	100			
52083	SST	165	55	55	0.1	0.0	0.1

Figure 1. SHIP/SYNOP mean daily count. JUNE 2002
Main hours only
Global average number of observations in 24 hours = 21086



0	0			0	0	0	0						0		0	0	0	0	0		0												0		0
3	0	5		0	0			4	4		2	1			4	6	4	3	22	23	13	0	4	0	5	4	4	8	7	6	7	4	0		0
11	16	15	13	4	8	16	4	12	4		0	18	15	19	39	38	34	151	144	107	84	61	44	45	16	28	15	12	24	35	20	14	8	8	8
12	23	44	15	59	41	41	39	26	0	11	18	12	8	7	7	25	709	1241	1038	311	148	115	115	111	141	140	73	89	101	85	49	33	24	17	8
11	10	8	10	11	63	41	33	64	190	124	102	67	29	22	22	26	420	843	970	605	145	107	51	88	90	90	62	94	154	177	120	74	17	12	11
4	5	5	8	12	24	47	46	68	117	70	16	14	14	25	54	46	321	237	118	141	237	107	97	65	74	16	82	173	231	288	137	49	11	5	4
3	4	18	5	3	3	20	65	53	67	63	11	11	6	3	8	52	8	30	10	19	81	53	79	60	82	85	89	221	231	95	30	12	7	4	3
0	1	5	1	2	1	2	14	59	69	54	100	14	4	1	19	78	79	47	22	17	56	38	22	8	80	20	76	176	41	145	12	10	2	5	1
1	1	3	2	1	0	1	1	2	13	64	25	19	4	11	7	11	41	47	23	6	40	15	5	5	36	21	59	80	63	69	10	8	19	12	15
3	2	3	1	4	0	1	2	2	9	37	32	24	68	61	1	5	6	5	15	4	47	9	7	0	8	3	2	52	74	37	15	28	10	1	17
27	2	2	10	1	1	2	1	0		28	62	44	90	33	1	2	3	5	14	44	47	42	13	5	1	1	3	5	3	34	66	77	16	19	21
6	1	5	6	4	2	0	3	0	0	16	58	136	76	4	4	1	1	4	42	99	58	17	18	1	0	0	0	2	52	10	57	102	100	26	4
2	2	1	1	0	0	0	1	0	1	22	83	89	1	1	0	1	1	1	29	63	2	1	1	1	4	0	0	0	42	22	88	237	110	6	10
2	1	0	0	0	0	0	0		1	31	26	1	1	0	0		4	0	0	0	4			0	5			0			0	89	1	1	6
		0						0	0	8	12	12	0	0		0	0		0					0	10								3		
											6	34	3				0	1	0		4			4	3		4	0	4			4			
															3		6		7									4						4	
																		4												0					

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoys.

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 06, 12, 18 UTC

Elements monitored
:Mean sea level pressure (hPa).
:Wind speed ($m\ s^{-1}$).
:Wind direction (degrees).
:Sea surface temperature (degrees).

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ : Percentage of observations flagged excluding those with gross errors

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. a positive bias indicates the wind observation is veered to the background.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 $m\ s^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA : NOBS ≥ 20 , and one or more of the following:

1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 $m\ s^{-1}$	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
21534	42.4	138.1	P	1166	100	100			
23911	11.0	84.7	P	21	71	100	1.1	-13.4	13.4
25552	69.6	-21.9	P	198	14	94	3.2	8.4	9.0
47556	60.6	-66.0	P	91	26	35	1.7	0.7	1.8
61536	33.9	35.6	P	148	0	91	4.6	-4.1	6.2
61664	41.9	28.0	P	27	0	100	0.5	-5.6	5.6
74903	-62.9	12.1	P	192	14	95	3.2	-9.1	9.6
WIND SPEED									
14537	-11.8	48.4	SPEED	282	1	100	5.4	6.3	8.3
23924	10.7	84.5	SPEED	248	5	100	1.8	12.4	12.5
53550	-12.9	112.0	SPEED	433	0	100	2.3	-6.1	6.6
WIND DIRECTION									
21535	23.2	148.9	DIRN.	78	0	0	22.4	-44.4	49.7
23924	10.7	84.5	DIRN.	225	5	0	22.5	81.8	84.9
41648	24.7	-70.5	DIRN.	445	0	0	18.7	30.5	35.8
52521	13.6	155.0	DIRN.	362	0	0	10.9	30.4	32.3
52649	11.7	153.7	DIRN.	317	0	0	20.9	44.5	49.2
52656	14.4	142.1	DIRN.	264	0	0	14.7	-31.7	35.0
SEA SURFACE TEMPERATURE									
14535	6.2	49.5	SST	66	0	98	1.0	6.0	6.1
15613	5.9	5.0	SST	122	1	70	2.0	-3.1	3.7
16940	-41.7	63.8	SST	581	0	91	0.5	-3.4	3.5
17905	-22.5	71.2	SST	134	0	100	0.1	3.0	3.0
23911	10.7	84.3	SST	242	47	100	5.1	-1.0	5.2
23962	3.7	94.6	SST	111	40	70	2.8	-1.3	3.1
31974	-39.7	-19.6	SST	76	7	100	1.2	3.4	3.6
33502	-31.7	-19.4	SST	106	0	100	0.5	3.9	3.9
33629	-42.6	4.1	SST	213	0	81	0.9	3.5	3.7
41666	38.1	-68.3	SST	1549	0	76	2.1	3.7	4.3
44504	45.1	-43.3	SST	401	53	74	3.5	1.8	3.9
44506	42.0	-49.9	SST	299	0	83	1.9	-4.6	5.0
44508	42.1	-49.2	SST	143	19	95	2.0	-5.4	5.7
44512	48.2	-41.4	SST	339	0	100	1.3	4.7	4.8
44621	59.1	-44.7	SST	1440	0	100	1.8	4.9	5.2
44726	59.1	-43.0	SST	1471	0	50	2.8	3.0	4.1
44768	47.3	-48.7	SST	60	100	100			
46972	20.4	-130.1	SST	202	0	100	0.3	3.0	3.1
55905	-51.7	-142.2	SST	881	0	100	0.3	3.7	3.7
61536	33.9	35.6	SST	147	0	77	2.7	4.7	5.4

Figure 2. DRIFTER mean daily count. JUNE 2002

Main hours only

Global average number of observations in 24 hours = 10965

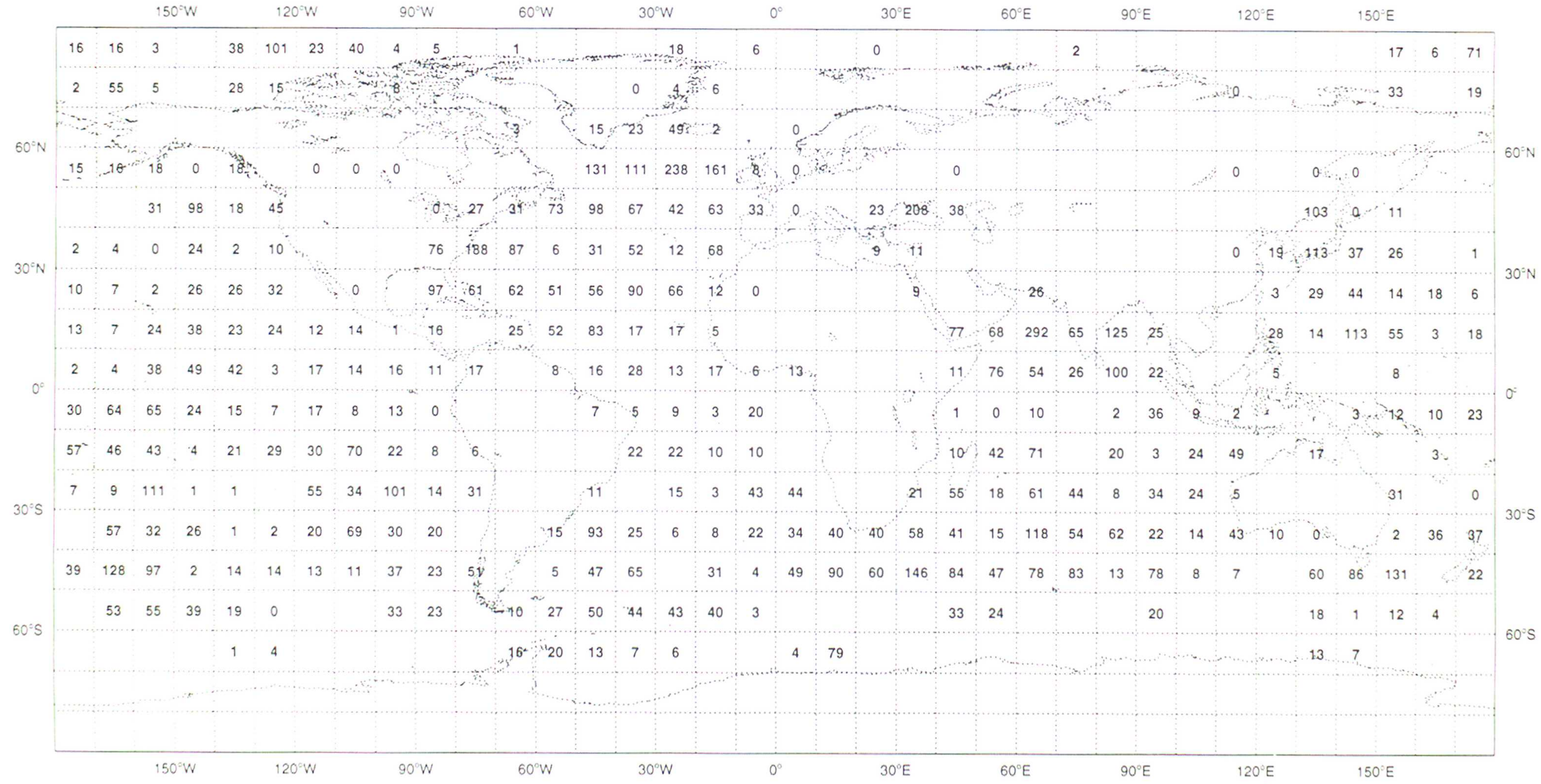

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
16 16 3 38 101 23 40 4 5 1 18 6 0 2 17 6 71
2 55 5 28 15 8 0 4 6 0 33 19
3 15 23 49 2 0
15 16 18 0 18 0 0 0 131 111 238 161 8 0 0 0 0 0
31 98 18 45 0 27 31 73 98 67 42 63 33 0 23 208 38 103 0 11
2 4 0 24 2 10 76 188 87 6 31 52 12 68 9 11 0 19 113 37 26 1
10 7 2 26 26 32 0 97 61 62 51 56 90 66 12 0 9 26 3 29 44 14 18 6
13 7 24 38 23 24 12 14 1 16 25 52 83 17 17 5 77 68 292 65 125 25 28 14 113 55 3 18
2 4 38 49 42 3 17 14 16 11 17 8 16 28 13 17 6 13 11 76 54 26 100 22 5 8
30 64 65 24 15 7 17 8 13 0 7 5 9 3 20 1 0 10 2 36 9 2 3 12 10 23
57 46 43 4 21 29 30 70 22 8 6 22 22 10 10 10 42 71 20 3 24 49 17 3
7 9 111 1 1 55 34 101 14 31 11 15 3 43 44 21 55 18 61 44 8 34 24 5 31 0
57 32 26 1 2 20 69 30 20 15 93 25 6 8 22 34 40 40 58 41 15 118 54 62 22 14 43 10 0 2 36 37
39 128 97 2 14 14 13 11 37 23 51 5 47 65 31 4 49 90 60 146 84 47 78 83 13 78 8 7 60 86 131 22
53 55 39 19 0 33 23 10 27 50 44 43 40 3 33 24 20 18 1 12 4
1 4 16 20 13 7 6 4 79 13 7

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60437	36.3N	2.8E	981	S8	84	0	0	0	0.9	-6.9	7.0
60476	35.4N	7.2E	1116	S8	83	6	7	0	0.8	13.6	13.6
60728	36.4N	10.7E	1	MS	45	0	0	0	0.9	-8.3	8.3
61492	16.1N	13.5W	18	MS	67	0	0	1	1.2	4.3	4.5
62790	12.1N	24.9E	674	MS	56	3	5	5	1.9	4.0	4.4
63330	13.5N	39.5E	2070	MS	33	32	97	42	0.0	12.9	12.9
63333	11.1N	39.7E	1903	MS	34	0	0	0	0.7	4.4	4.5
63334	10.3N	37.7E	2515	MS	32	0	0	0	0.9	10.9	10.9
63402	7.7N	36.8E	1725	MS	34	0	0	0	1.4	8.4	8.5
63450	9.0N	38.8E	2354	MS	34	0	0	0	0.8	4.3	4.4
63453	8.9N	39.9E	930	S	33	1	3	0	1.0	-4.4	4.5
63471	9.6N	41.9E	1260	MS	33	0	0	6	2.7	8.9	9.3
63478	5.9N	43.6E	295	MS	32	0	0	0	0.6	5.6	5.6
63801	4.9S	29.6E	882	S8	80	0	0	3	2.3	7.2	7.6
65355	9.8N	1.1E	342	MS	94	1	1	0	2.2	-11.6	11.8
67308	22.1S	31.7E	452	M	46	46	100	0			
68030	18.5S	25.6E	1071	8	82	0	0	1	1.0	4.3	4.4
68338	26.9S	24.6E	1234	S8	67	67	100	0			
68396	26.5S	31.3E	641	S8	57	1	2	5	1.4	4.6	4.8
68558	30.9S	27.6E	1816	S8	62	62	100	13			
68575	30.0S	30.0E	1175	S8	116	116	100	0			
68754	32.5S	27.5E	899	S8	80	80	100	1			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
23975	60.4N	88.4E	86	7	118	118	100	0			
30554	54.5N	113.6E	995	MS	120	0	0	0	5.0	4.7	6.9
30967	49.9N	115.8E	623	MS	84	3	4	0	1.4	-5.5	5.7
38744	39.3N	73.3E	4267	S8	36	18	50	0	1.1	-0.2	1.1
40713	37.4N	46.3E	1475	MS	58	3	5	0	0.9	12.9	12.9
40726	36.8N	45.7E	1384	MS	59	0	0	0	0.7	4.2	4.3
41254	23.1N	57.7E	1755	S8	84	84	100	0			
41696	29.0N	66.6E	2015	S8	71	2	3	0	3.1	4.9	5.8
43415	8.8N	80.5E	98	S	32	32	100	0			
44416	28.6N	81.6E	720	MS	50	0	0	0	0.9	4.5	4.6
47022	40.8N	128.2E	1200	S	65	0	0	2	1.5	4.6	4.8
47127	36.9N	127.0E	16	MS	120	0	0	0	0.7	-11.4	11.4
48925	20.7N	102.0E	550	M	25	2	8	100	1.1	-13.4	13.4
48935	19.5N	103.1E	1050	8	31	0	0	97	2.1	-5.6	6.0
51495	43.5N	91.6E	874	M	110	0	0	0	1.2	5.4	5.5
52602	38.8N	93.4E	2734	S	120	0	0	0	1.0	-6.7	6.8
52955	35.6N	100.8E	3201	S	120	0	0	0	0.9	12.1	12.1
56146	31.6N	100.0E	339	S	119	119	100	0			
56444	28.5N	98.9E	3488	S	120	0	0	0	0.6	13.2	13.2
56462	29.0N	101.5E	2994	S	118	0	0	0	1.2	8.7	8.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	128	MS	52	0	0	0	1.0	-5.7	5.8
80354	1.6N	75.5W	244	S	23	23	100	39			
82181	2.0S	54.1W	146	MS	86	0	0	0	0.9	4.8	4.9
82353	3.2S	52.2W	74	MS	86	1	1	0	0.7	-4.0	4.1
82704	7.6S	72.7W	170	MS	83	0	0	0	1.2	-4.2	4.4
83235	12.4S	46.4W	604	MS	86	0	0	2	1.2	5.9	6.0
83332	14.1S	46.4W	826	MS	84	14	17	0	0.6	13.9	13.9
83531	18.6S	46.5W	940	MS	86	0	0	0	0.5	-7.5	7.5
83836	25.5S	50.6W	837	MS	85	0	0	0	0.6	-5.3	5.3
84377	3.8S	73.3W	125	MS	97	0	0	0	1.1	4.7	4.8

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
84425	5.9S	76.1W	179	MS	67	0	0	1	1.0	4.1	4.2
84455	6.5S	76.4W	281	MS	84	0	0	0	1.0	7.4	7.5
84472	7.1S	78.5W	2620	S	54	0	0	0	0.9	-5.3	5.4
84474	7.2S	76.7W	350	S	24	0	0	0	0.8	9.8	9.8
84686	13.6S	72.0W	3248	S	106	1	1	1	0.8	-4.2	4.3
84688	13.7S	73.4W	3444	S	53	0	0	0	0.3	-12.8	12.8
84720	14.9S	75.0W	567	MS	55	0	0	0	0.6	5.7	5.7
84782	18.1S	70.3W	468	MS	87	0	0	0	1.5	8.8	8.9
85264	18.5S	64.1W	1998	S	55	55	100	0			
85312	19.8S	63.9W	992	S	43	4	9	7	2.1	-11.2	11.4
85406	18.3S	70.3W	55	M	119	0	0	1	1.2	4.9	5.0
85432	22.5S	68.9W	2320	S8	80	0	0	1	0.7	5.5	5.5
85836	43.6S	71.8W	277	M	37	0	0	3	2.7	4.1	4.9
88986	59.4S	27.3W	78	MS	468	252	54	0	1.4	0.3	1.4

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71023	65.9N	89.5W	18	MS	104	104	100	0			
71599	44.4N	65.2W	127	MS	113	0	0	32	0.6	-4.1	4.1
71747	48.8N	91.6W	424	MS	120	0	0	0	0.7	4.0	4.1
72327	36.1N	86.7W	182	MS	120	0	0	0	0.5	4.2	4.2
76118	30.4N	109.7W	1040	MS	30	0	0	0	0.5	-10.7	10.7
76243	28.7N	100.5W	250	MS	102	0	0	0	1.0	5.6	5.7
76543	22.0N	98.8W	104	MS	38	0	0	3	0.9	7.0	7.1
76625	20.6N	100.4W	1813	MS	40	0	0	0	0.7	-9.9	9.9
76640	20.9N	97.4W	28	MS	106	0	0	0	0.7	4.6	4.7
76658	19.2N	103.7W	494	MS	42	0	0	0	0.7	5.5	5.5
76743	18.0N	92.9W	10	MS	75	0	0	0	0.8	6.4	6.4
76762	17.5N	99.5W	1265	MS	89	2	2	43	1.3	4.1	4.3
76773	17.8N	97.8W	1650	MS	24	0	0	0	0.5	4.2	4.2
76840	16.2N	93.9W	64	MS	47	0	0	19	1.3	4.1	4.3
76903	14.9N	92.3W	118	MS	109	0	0	0	0.7	6.9	6.9

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	47	0	0	0	0.6	10.3	10.3
94322	20.2S	130.0E	340	MS	116	115	99	0	0.0	1.2	1.2
94368	20.3S	149.0E	2	MS	116	0	0	0	0.5	-4.7	4.7
95815	35.1S	144.0E	72	MS	119	0	0	12	2.7	4.6	5.3
96505	3.7N	115.7E	902	S8	43	40	93	0	0.5	0.4	0.6
97378	10.7S	123.1E	1	MS	48	47	98	0	0.0	-14.4	14.4

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
06685	47.0N	9.1E	515	MS	119	0	0	1	1.2	5.8	5.9
10557	50.5N	11.1E	845	S8	360	360	100	0			
12140	54.4N	18.7E	2	MS	120	0	0	0	0.6	8.0	8.0
13269	44.3N	19.9E	176	MS	117	0	0	0	0.9	7.8	7.9
14554	44.9N	18.4E	140	S	56	2	4	2	0.8	-12.6	12.6
14650	43.8N	18.0E	972	S	56	0	0	0	0.8	4.9	5.0
15140	46.5N	22.4E	500	S8	26	24	92	0	1.0	3.1	3.3
15284	45.6N	26.4E	1632	S8	40	1	3	0	2.4	5.4	5.9
16470	36.8N	12.0E	191	MS	93	0	0	0	0.6	-4.1	4.1
17092	39.8N	39.5E	1218	S8	120	0	0	0	1.5	7.9	8.0
17190	38.8N	30.5E	1034	S8	119	0	0	58	1.3	4.8	5.0
17203	38.9N	40.5E	1177	S8	118	0	0	0	1.2	8.0	8.1
40296	31.0N	35.5E	-350	M	102	2	2	2	1.4	4.2	4.4

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	106	0	0	0	1.5	-7.4	7.6
89208	90.0S	0.0W	2835	M	20	20	100	0			
89263	66.0S	66.1W	20	M	237	2	1	0	2.4	8.8	9.1
89264	71.4S	68.9W	780	S	265	0	0	0	1.4	7.1	7.2
89266	72.2S	60.3W	91	S	258	120	47	0	1.9	-12.7	12.8
89272	74.8S	71.5W	1369	S	264	264	100	0			
89512	70.8S	11.8E	140	MS	117	0	0	0	1.8	-4.7	5.0
89744	74.0S	43.0E	3353	S	272	0	0	0	0.8	7.7	7.7
89769	78.5S	168.4E	50	S	388	388	100	0			
89847	67.6S	146.0E	30	S	299	4	1	0	2.3	-8.4	8.7

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in $m\ s^{-1}$

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 $m\ s^{-1}$ Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	2200	0	35	1.3	0.3	2175	0	35	0	5.5	0.5
AAL	6251	0	28	1.2	0.1	6026	0	28	0	5.7	0.6
AAR	1455	0	7	1.6	-0.4	1442	0	7	0	7.6	0.4
ACA	3718	0	7	1.6	0.0	3244	0	8	0	6.9	0.5
ACI	62	0	50	1.1	0.6	62	0	50	0	6.6	0.6
AEA	898	1	3	1.5	0.6	508	0	4	0	6.4	0.8
AEL	290	0	10	1.7	-0.7	244	0	11	0	6.3	0.6
AFL	698	0	4	2.1	0.7	539	1	6	0	8.0	1.1
AFR	1644	1	8	1.7	0.5	1271	0	9	0	7.4	0.3
AIS	128	2	13	1.7	0.5	120	0	14	0	10.3	0.1
AJM	485	1	6	1.3	-0.2	391	0	6	0	6.9	1.0
AJX	240	1	6	1.6	1.1	239	0	6	0	7.9	0.1
AMM	137	1	8	1.5	0.3	105	0	8	0	6.5	0.4
AMT	1565	0	35	0.8	0.0	1558	0	35	0	4.7	0.2
AMX	331	2	4	1.4	0.2	246	0	7	0	9.8	0.3
ANA	354	0	4	1.3	0.8	353	0	5	0	5.6	0.6
ANZ	3591	0	29	1.4	0.4	3573	0	29	0	6.6	0.6
AVA	267	0	3	1.8	1.0	180	0	3	0	5.9	0.9
AVE	172	3	8	1.8	0.8	101	0	7	0	6.9	0.9
AVN	143	0	48	1.1	0.3	142	0	49	0	8.4	1.4
AXF	25	0	16	1.1	0.0	25	0	20	0	11.6	0.2
AZA	438	1	6	1.5	0.2	352	0	5	0	5.9	0.8
BAL	178	1	8	0.9	0.3	153	0	9	0	8.3	0.4
BAW	927	0	11	1.6	-0.3	858	0	10	0	6.2	0.4
BSK	81	1	22	1.5	0.3	77	0	27	0	9.6	2.4
BWA	288	2	5	1.8	1.2	205	0	3	0	6.6	1.1
CAL	92	1	7	1.6	0.4	98	0	6	0	7.0	0.8
CCA	281	4	17	2.4	0.8	310	0	100	0	12.2	-0.4
CES	363	2	7	1.7	0.5	369	2	8	0	8.9	-0.4
CFC	20	5	15	2.2	-0.7	20	0	10	0	5.9	2.5
CFG	817	0	5	1.6	-0.5	645	0	6	0	7.4	0.4
CGB	24	4	4	1.3	-0.5	26	0	0	0	6.0	1.5
CGH	32	0	0	1.0	0.4	32	0	0	0	3.7	-0.2
CKS	271	0	43	2.6	2.2	278	0	43	0	4.9	1.1
CLX	490	0	5	1.6	-0.3	377	0	7	0	7.3	0.3
CMI	89	1	16	1.2	0.3	96	0	14	0	5.8	-0.2
COA	993	1	37	1.2	-0.1	953	0	37	0	5.4	0.2
CPA	22	0	14	1.5	0.8	25	0	20	0	10.3	-1.0
CRL	807	1	9	1.4	0.2	623	0	13	0	9.2	1.2
CSN	79	1	6	1.7	0.2	81	0	6	0	6.0	0.8
CUB	290	1	4	1.8	0.7	229	0	7	0	8.3	0.6
DAB	40	0	3	1.4	-0.1	38	0	3	0	4.1	1.2
DAI	43	0	0	1.3	0.5	37	0	0	0	3.8	0.0
DAL	2806	0	39	1.1	-0.1	2686	0	40	0	5.4	0.2
DBR	44	0	0	1.4	-0.6	44	0	0	0	5.8	0.0
DCE	133	0	7	0.9	0.2	120	0	11	0	7.8	-0.1
DHL	37	0	86	6.5	-6.4	35	0	14	0	9.6	3.4
DLH	1520	1	10	1.6	0.1	1358	0	12	0	6.8	1.1
EDW	76	0	5	1.2	0.0	72	0	3	0	5.7	0.7
EIA	278	0	12	1.6	0.2	262	0	100	0	15.6	4.1
ELY	129	0	2	1.4	0.0	130	0	2	0	5.6	1.0
ETH	44	0	9	0.8	0.2	49	0	10	0	5.8	-0.9
EVA	83	1	8	1.9	0.0	98	0	6	0	7.6	-0.3
EWW	103	0	1	1.5	0.1	102	0	3	0	9.5	1.5
FDX	1980	1	37	1.2	0.4	1961	0	38	0	7.6	0.7
FIN	292	0	3	1.8	0.4	273	0	3	0	6.2	0.6
FJI	906	1	48	1.4	0.6	869	0	48	0	9.6	0.6
FOM	353	1	20	1.4	0.2	350	0	18	0	7.4	0.4
GAF	77	1	3	1.9	-0.5	75	0	1	0	7.2	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
GCO	294	0	16	1.3	0.2	295	0	100	0	11.5	2.3
GHA	59	0	0	1.2	-0.1	45	0	2	0	8.6	1.6
GOL	26	0	81	6.5	5.3	28	0	18	0	11.3	1.2
GRL	35	0	0	1.0	0.3	27	0	0	0	5.0	0.8
GTI	227	0	7	1.8	-0.4	229	0	8	0	7.3	1.2
HAL	4353	0	32	1.2	0.0	4275	0	32	0	7.0	0.9
IBE	2972	1	6	1.5	0.6	1931	0	8	0	6.8	0.5
ICE	857	0	2	1.5	-0.1	784	0	2	0	6.2	0.5
IWD	237	2	5	1.6	-0.2	153	0	3	0	6.2	1.2
JAA	61	2	8	2.9	1.6	60	0	0	0	6.8	1.6
JAL	2729	0	4	1.7	0.7	2672	0	4	0	7.2	0.4
JAZ	1045	0	5	1.8	1.4	1036	0	5	0	6.4	0.5
JBU	34	3	6	1.5	0.4	37	0	3	0	6.1	0.2
JMC	72	0	4	1.2	0.5	57	0	5	0	6.4	0.3
KAL	2845	1	8	1.6	0.2	2840	0	9	0	7.8	0.1
KIW	25	4	52	1.9	1.1	25	0	48	0	4.1	0.3
KLM	1885	1	3	1.4	0.3	1490	0	3	0	6.3	0.7
LAN	127	6	19	2.5	0.2	122	0	20	0	14.1	-0.6
LAP	80	4	45	2.3	1.2	77	0	43	0	8.7	3.1
LDA	51	0	8	1.2	-0.1	42	0	12	0	8.6	0.7
LDI	415	1	6	2.3	0.8	298	0	5	0	7.7	0.3
LIB	560	1	6	1.6	1.0	378	0	4	0	7.3	0.7
LOB	21	0	38	2.9	-2.8	27	0	33	0	6.3	0.9
LOT	153	1	1	1.5	-1.0	142	1	3	0	6.9	1.5
LTU	812	1	4	1.5	0.2	667	0	5	0	6.1	0.6
LXR	34	3	9	2.0	0.9	25	0	12	0	13.9	0.1
MAS	269	0	6	1.5	0.0	263	0	6	0	6.8	0.4
MON	65	2	3	1.6	0.2	51	0	2	0	5.3	-0.1
MPD	390	1	7	1.3	-0.2	271	0	8	0	7.7	1.6
MPH	650	0	5	1.5	-0.4	591	0	5	0	7.4	0.0
MYT	362	1	4	1.2	0.1	326	0	4	0	5.8	0.7
NCA	947	0	3	1.8	0.3	697	0	4	0	7.1	0.4
NGA	44	0	7	2.4	1.4	29	0	0	0	5.1	0.0
NWA	9150	1	8	1.6	0.6	9076	0	8	0	7.5	0.3
NZL	3672	0	11	1.4	0.3	3672	0	11	0	6.2	0.7
OAE	183	1	36	2.1	0.2	179	1	34	0	5.7	0.4
PAC	495	2	27	1.5	0.3	496	0	25	0	6.7	0.2
PAL	1488	0	13	1.3	0.0	1390	0	13	0	7.6	0.5
PAO	332	1	55	1.6	0.4	328	0	55	0	9.7	1.1
PUA	54	0	31	2.4	0.4	46	0	35	0	20.4	4.2
QFA	2302	0	39	1.4	0.3	2292	0	39	0	6.1	0.2
RAF	35	0	0	1.8	1.3	35	0	3	0	7.6	-0.5
RAM	302	1	4	1.5	0.1	159	1	3	0	6.4	0.7
RCH	386	1	100	3.0	-1.0	356	0	100	0	9.7	2.5
RJA	30	0	0	1.5	-0.6	31	0	6	0	7.6	1.0
ROM	28	0	7	0.8	0.0	28	0	7	0	5.3	1.4
RRR	97	0	5	1.7	-0.1	89	0	8	0	7.4	1.1
RYN	369	1	37	1.1	0.2	366	0	37	0	5.6	0.1
RZO	362	0	56	2.3	1.1	193	0	2	0	6.6	0.7
SAA	322	0	2	1.3	-0.4	265	0	4	0	7.3	0.6
SIA	255	0	2	1.4	0.1	257	0	2	0	6.2	0.6
SLR	256	0	8	1.2	0.2	246	0	11	0	7.8	0.6
SQC	42	0	0	1.4	0.5	42	0	0	0	5.3	0.5
SSV	57	0	5	1.4	0.2	54	0	6	0	10.3	0.6
SVA	30	0	3	1.3	0.0	33	0	3	0	5.0	0.9
TAG	46	0	15	2.5	0.2	42	0	17	0	12.6	-0.3
TAM	57	0	23	1.8	0.9	58	0	24	0	10.3	3.3
TAP	792	1	5	1.5	-0.2	319	0	9	0	9.0	0.4
THA	153	0	6	1.4	-0.1	153	0	7	0	7.5	0.7

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
THT	101	1	24	2.0	0.6	96	0	21	0	6.7	1.9
TPA	54	0	9	0.9	0.3	49	0	10	0	6.8	0.6
TSC	282	0	4	1.8	0.1	238	0	3	0	6.3	0.7
UAL	162672	0	97	1.0	0.0	163304	0	97	0	4.9	0.6
UPS	1838	0	52	1.8	0.4	1791	0	50	0	6.7	0.4
USA	193	2	2	1.1	0.1	163	0	3	0	6.6	1.6
VIR	255	1	5	1.6	-0.1	245	0	6	0	7.8	0.4
VPB	24	0	4	2.9	1.0	25	0	4	0	13.1	0.2
VRG	216	1	100	2.4	0.6	208	0	100	0	11.6	2.2
VVR	70	0	24	2.6	0.0	70	0	27	0	9.2	1.0
WOA	230	1	7	1.8	0.5	218	0	13	0	10.6	0.8
YSS	67	3	9	1.3	0.9	41	0	10	0	9.5	-0.3
9VS	20	0	0	1.4	0.0	20	0	0	0	3.7	0.3
AR	1194	0	100	3.4	3.3	1176	0	3	0	5.2	0.9
AU	29794	0	11	1.3	0.6	29797	0	11	0	5.6	0.5
EU	111766	0	30	1.3	0.4	111764	0	29	0	4.7	0.4
KL	2099	0	5	1.4	0.8	2094	0	6	0	6.1	0.6
LH	2846	0	9	1.6	1.1	2827	0	9	0	5.0	0.7
MK	936	0	5	1.6	1.3	938	0	7	0	7.4	1.0
SA	5534	0	60	1.8	1.2	5532	0	10	0	6.9	1.3
TN	36	0	22	1.7	0.3	38	0	26	0	8.2	2.6
WA	266	1	11	1.7	0.6	266	2	13	0	7.0	0.6
XX	2684	1	9	1.3	0.3	2672	0	11	0	8.4	1.5
N	956	1	15	1.9	0.4	960	0	16	0	7.3	1.1
US ACARS	988481	1	60	1.3	0.5	988478	0	60	0	5.3	0.8

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	95	0	17	2.2	0.6	88	0	11	0	5.3	0.5
AAR	23	0	22	1.1	-0.5	24	0	21	0	3.9	1.7
ACA	44	0	20	1.2	0.1	41	0	22	0	5.7	-0.6
ACI	25	0	60	1.0	0.6	25	0	60	0	6.3	4.7
AFR	85	0	6	1.8	0.4	70	0	11	0	11.4	2.0
ANZ	162	1	28	1.5	-0.2	165	0	29	0	8.9	1.7
ARG	23	4	17	3.0	-0.3	22	5	14	0	13.5	5.5
AXF	23	0	22	1.3	1.0	23	0	26	0	17.3	-0.2
CFC	149	2	9	1.7	0.7	134	0	11	0	7.3	1.3
COA	129	2	43	1.6	-0.3	127	0	39	0	6.8	-0.2
CUB	26	0	4	1.2	0.5	21	0	5	0	4.8	0.8
DAL	166	0	30	1.3	-0.4	151	0	33	0	5.4	0.1
DLH	172	1	17	1.6	0.1	168	0	17	0	6.6	0.7
EWW	59	0	0	1.3	0.4	60	0	2	0	7.7	0.6
FDX	412	1	33	1.6	0.6	424	0	34	0	7.8	0.0
FIN	23	0	0	1.4	0.7	21	0	0	0	5.6	1.1
FJI	28	11	43	1.7	0.5	26	0	38	0	14.5	6.2
GAF	52	2	12	2.4	-0.2	49	0	6	0	8.7	2.7
GCO	230	1	10	1.6	0.2	226	0	100	0	14.9	4.9
GHA	37	8	8	0.9	-0.2	31	0	3	0	9.4	1.6
HAL	54	4	41	2.6	0.3	54	0	41	0	13.1	1.2
IBE	59	2	20	2.1	0.9	48	0	25	0	10.3	2.5
ICE	60	0	2	1.6	-0.1	55	0	0	0	6.7	1.2
JAA	20	0	15	1.7	1.3	20	0	10	0	4.8	2.3
JAL	57	2	12	2.0	0.7	58	0	7	0	6.3	0.8
JAZ	71	1	3	1.9	1.0	71	1	6	0	9.6	1.5
KAL	66	2	21	1.1	-0.3	65	0	23	0	7.8	-0.6
KIW	34	6	59	2.7	1.8	31	0	61	0	8.0	0.7
KLM	59	0	0	1.4	0.4	46	0	2	0	7.2	0.4
LAN	139	8	16	2.9	0.3	148	0	11	0	13.1	5.1
LIB	28	0	0	1.3	0.8	21	0	0	0	4.4	0.9
MAS	41	0	22	1.7	-0.7	41	0	24	0	6.2	0.4
MPH	36	0	0	1.1	0.0	33	0	3	0	7.5	2.6
NCA	104	0	4	1.9	0.2	81	0	6	0	8.2	0.4
NWA	495	0	6	1.5	0.4	478	0	6	0	7.8	-0.7
NZL	21556	0	60	1.3	0.4	21556	0	60	0	5.6	-0.1
PAC	43	2	7	1.4	-0.2	42	0	5	0	6.0	0.4
QFA	171	4	33	1.8	0.3	173	1	31	0	6.3	0.5
RCH	153	3	100	4.2	-1.2	138	0	100	0	11.8	2.8
RRR	254	4	21	2.7	1.3	250	0	16	0	11.1	0.3
SAA	55	4	5	1.4	-0.7	52	0	2	0	6.7	0.3
SIA	46	0	0	0.9	0.0	47	0	0	0	5.2	1.3
UAL	331001	0	99	1.2	0.0	330556	0	99	0	4.3	0.4
UPS	176	2	50	2.1	0.7	173	1	43	0	8.2	1.2
VVP	47	4	43	3.4	1.1	49	0	37	0	10.4	1.8
WOA	22	0	5	1.2	0.1	23	0	26	0	13.0	0.2
AR	652	0	100	2.0	1.5	645	0	46	0	4.5	0.6
AU	19113	0	49	1.2	0.4	19115	0	49	0	4.6	-0.2
EU	526346	0	68	1.0	0.2	524057	0	68	0	3.8	0.1
KL	1659	0	55	1.7	0.5	1659	0	55	0	4.4	0.5
LH	1390	0	63	1.3	0.3	1380	0	63	0	4.4	1.1
MK	726	0	53	1.4	0.7	723	0	53	0	3.9	0.5
SA	4000	0	76	1.7	0.7	3999	0	55	0	4.7	0.8
WA	42	2	19	2.1	-0.2	42	2	17	0	8.1	1.2
XX	397	5	15	1.9	0.0	396	0	16	0	10.8	2.0
N	25	32	44	2.9	1.8	22	0	18	0	11.7	5.4
US ACARS	1854930	0	78	1.3	0.3	1849022	0	78	0	4.1	0.3

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 46367

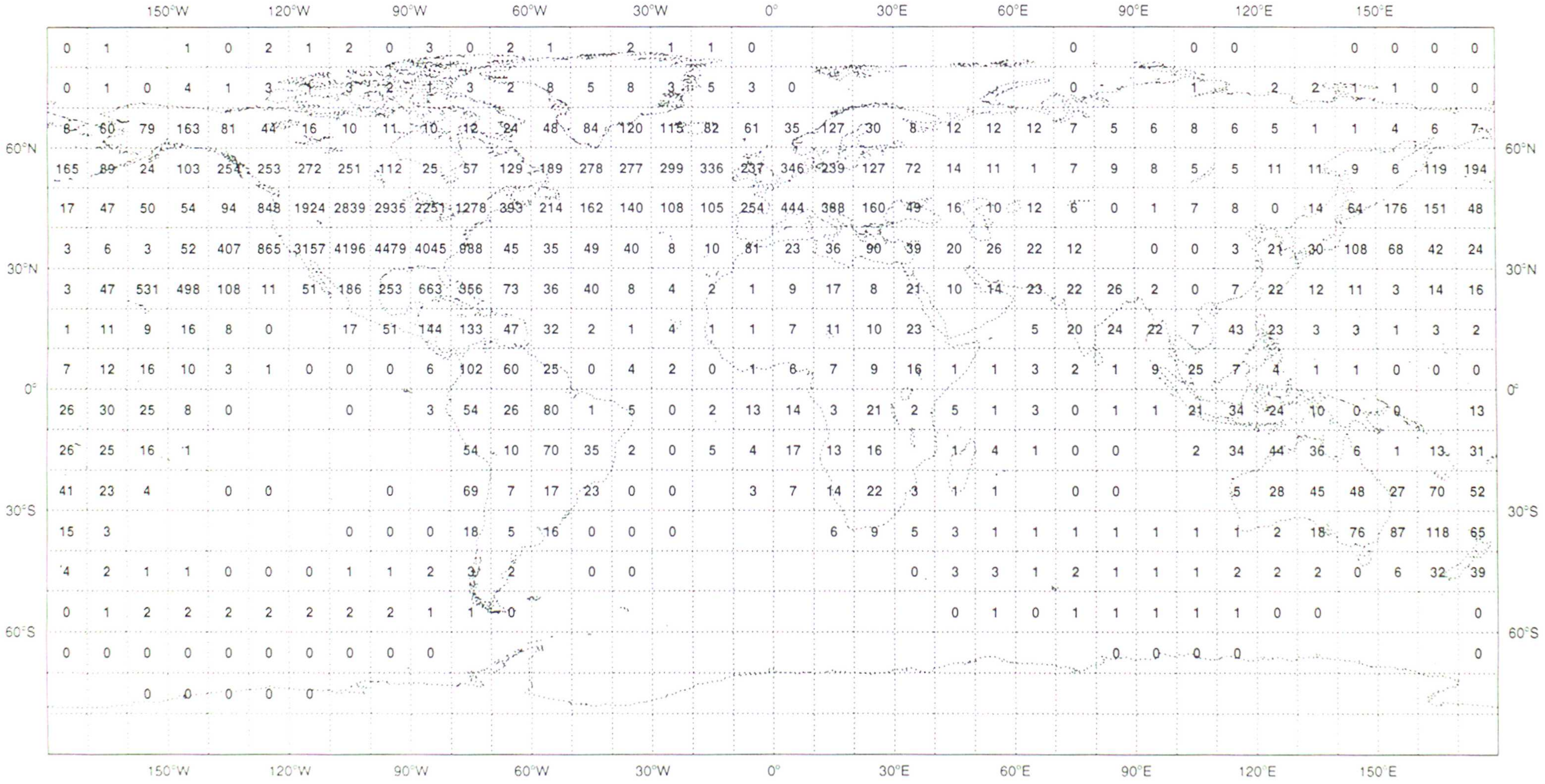

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0 1 1 0 2 1 2 0 3 0 2 1 2 1 1 0 0 0 0 0 0 0 0
0 1 0 4 1 3 3 2 1 3 2 8 5 8 3 5 3 0 0 1 2 2 1 1 0 0
8 60 79 163 81 44 16 10 11 10 12 24 48 84 120 115 82 61 35 127 30 8 12 12 12 7 5 6 8 6 5 1 1 4 6 7
165 89 24 103 254 253 272 251 112 25 57 129 189 278 277 299 336 237 346 239 127 72 14 11 1 7 9 8 5 5 11 11 9 6 119 194
17 47 50 54 94 848 1924 2839 2935 2251 1278 393 214 162 140 108 105 254 444 388 160 49 16 10 12 6 0 1 7 8 0 14 64 176 151 48
3 6 3 52 407 865 3157 4196 4479 4045 988 45 35 49 40 8 10 81 23 36 90 39 20 26 22 12 0 0 3 21 30 108 68 42 24
3 47 531 498 108 11 51 186 253 663 356 73 36 40 8 4 2 1 9 17 8 21 10 14 23 22 26 2 0 7 22 12 11 3 14 16
1 11 9 16 8 0 17 51 144 133 47 32 2 1 4 1 1 7 11 10 23 5 20 24 22 7 43 23 3 3 1 3 2
7 12 16 10 3 1 0 0 0 6 102 60 25 0 4 2 0 1 6 7 9 16 1 1 3 2 1 9 25 7 4 1 1 0 0 0
26 30 25 8 0 0 3 54 26 80 1 5 0 2 13 14 3 21 2 5 1 3 0 1 1 21 34 24 10 0 0 13
26 25 16 1 54 10 70 35 2 0 5 4 17 13 16 1 4 1 0 0 2 34 44 36 6 1 13 31
41 23 4 0 0 0 69 7 17 23 0 0 3 7 14 22 3 1 1 0 0 5 28 45 48 27 70 52
15 3 0 0 0 18 5 16 0 0 0 6 9 5 3 1 1 1 1 1 1 1 2 18 76 87 118 65
4 2 1 1 0 0 0 1 1 2 3 2 0 0 0 3 3 1 2 1 1 1 2 2 2 0 6 32 39
0 1 2 2 2 2 2 2 2 1 1 0 0 1 0 1 1 1 1 1 0 0 0
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0 0 0 0 0

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 91913

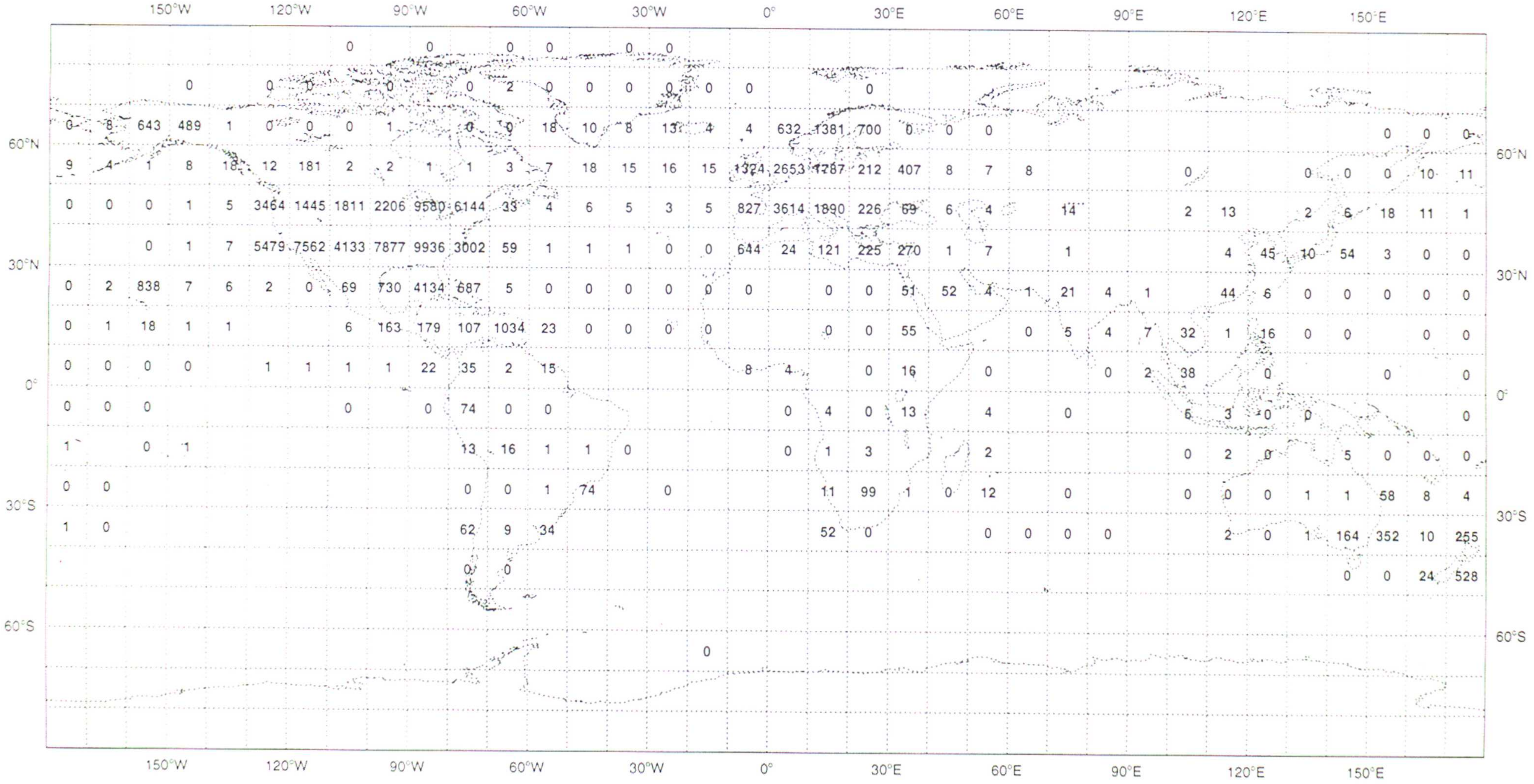

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0
0 0 0 0 0 2 0 0 0 0 0 0 0
0 8 643 489 1 0 0 0 1 0 0 18 10 8 13 4 4 632 1381 700 0 0 0 0 0 0
9 4 1 8 18 12 181 2 2 1 1 3 7 18 15 16 15 1324 2653 1287 212 407 8 7 8 0 0 0 0 10 11
0 0 0 1 5 3464 1445 1811 2206 9580 6144 33 4 6 5 3 5 827 3614 1890 226 69 6 4 14 2 13 2 6 18 11 1
0 1 7 5479 7562 4133 7877 9936 3002 59 1 1 1 0 0 644 24 121 225 270 1 7 1 4 45 10 54 3 0 0
0 2 838 7 6 2 0 69 730 4134 687 5 0 0 0 0 0 0 0 0 51 52 4 1 21 4 1 44 6 0 0 0 0 0
0 1 18 1 1 6 163 179 107 1034 23 0 0 0 0 0 0 55 0 5 4 7 32 1 16 0 0 0 0
0 0 0 0 1 1 1 1 22 35 2 15 8 4 0 16 0 0 2 38 0 0 0
0 0 0 0 0 74 0 0 0 4 0 13 4 0 6 3 0 0 0
1 0 1 13 16 1 1 0 0 1 3 2 0 2 0 5 0 0 0
0 0 0 0 1 74 0 11 99 1 0 12 0 0 0 0 1 1 58 8 4
1 0 62 9 34 52 0 0 0 0 0 2 0 1 164 352 10 255
0 0 0 0 24 528
0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

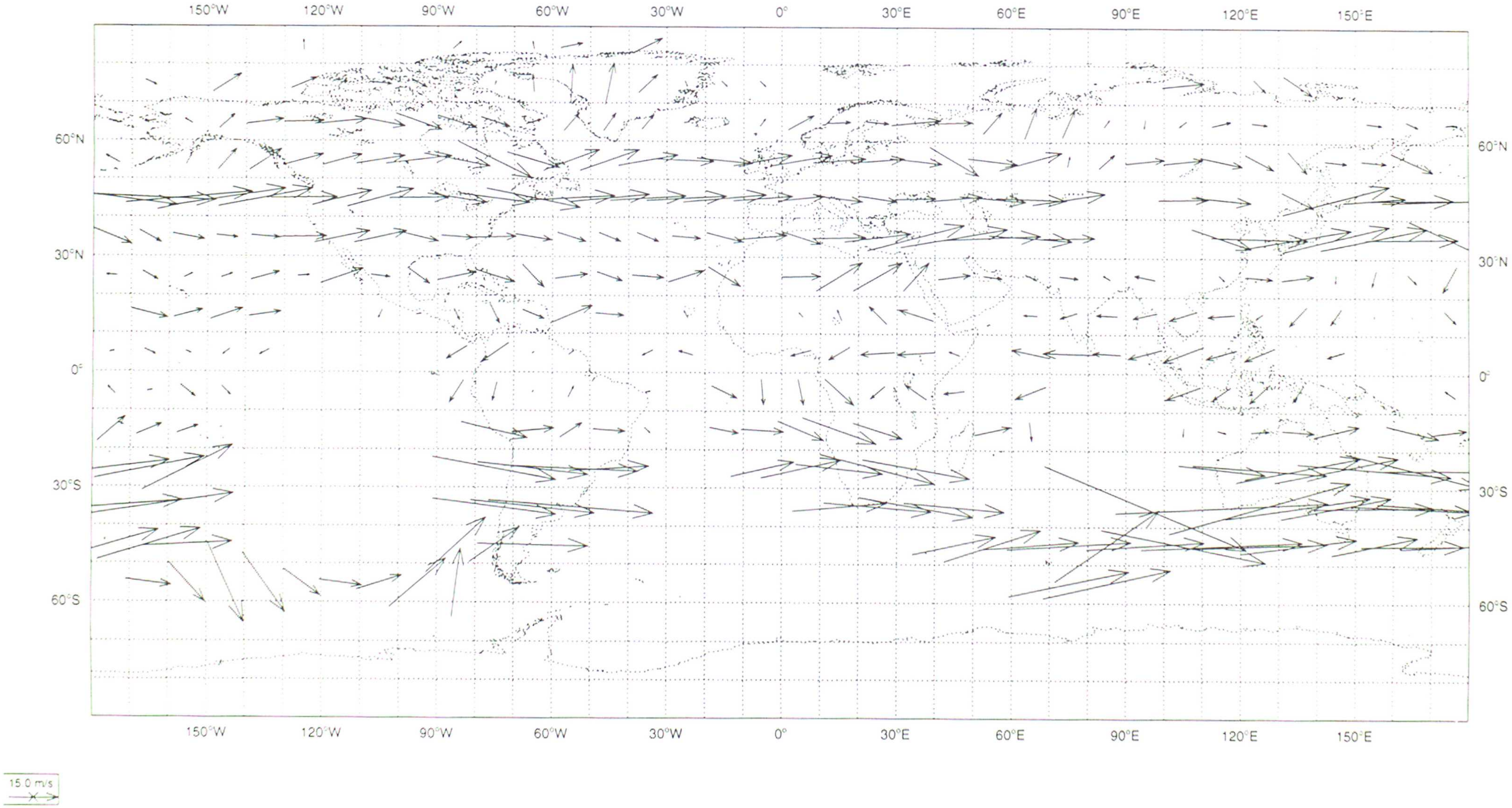
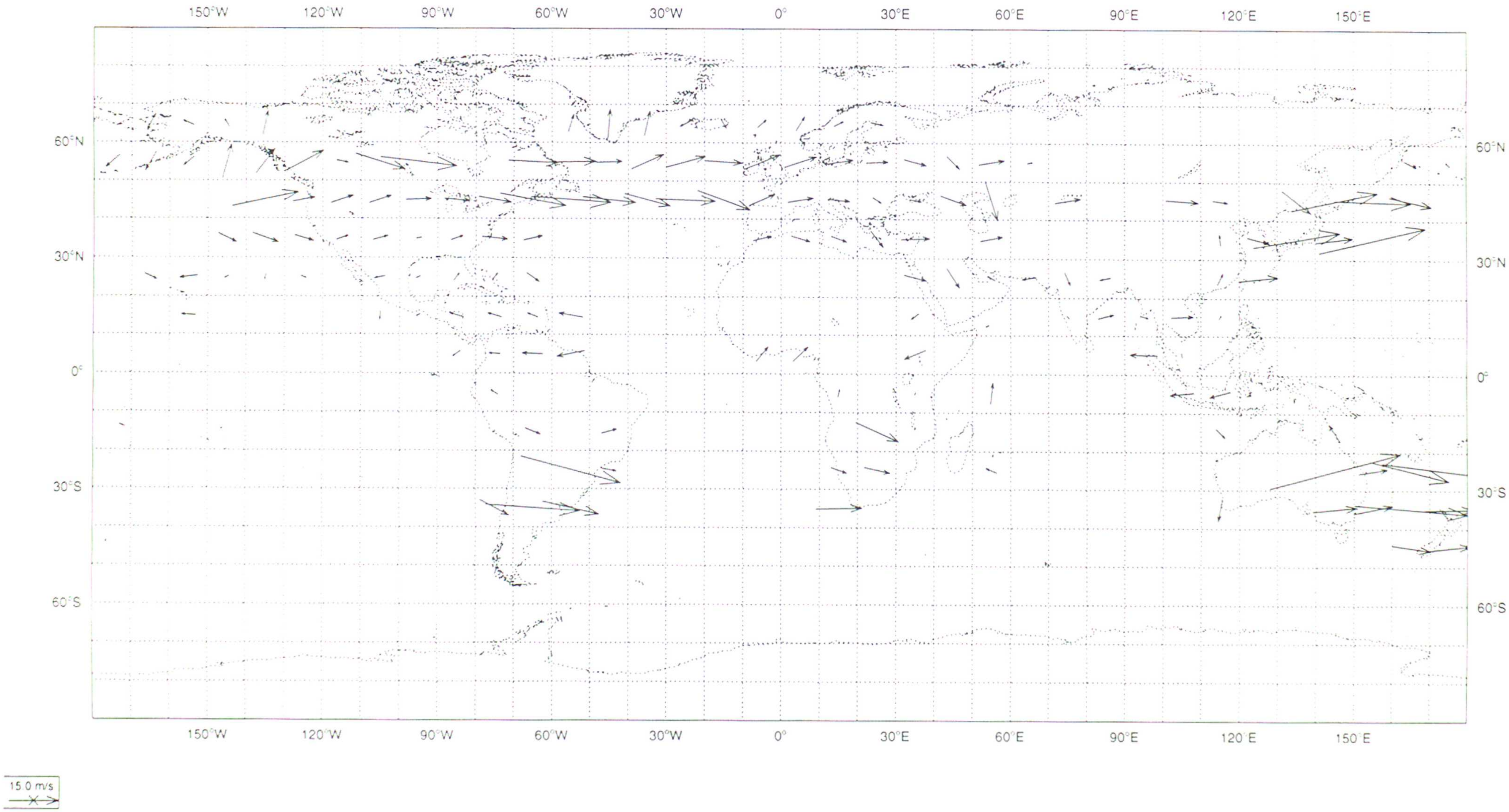

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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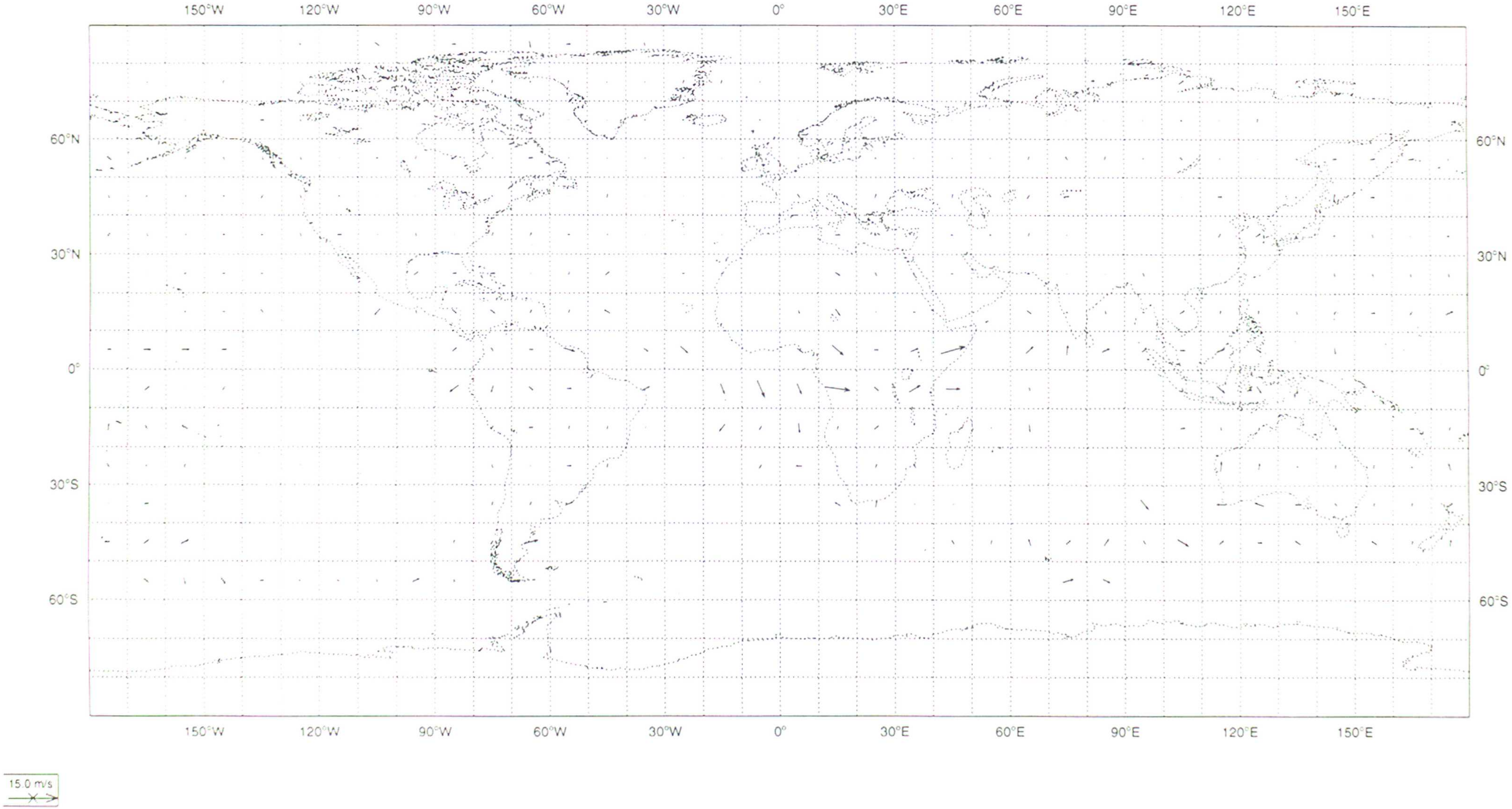
60°S
15.0 m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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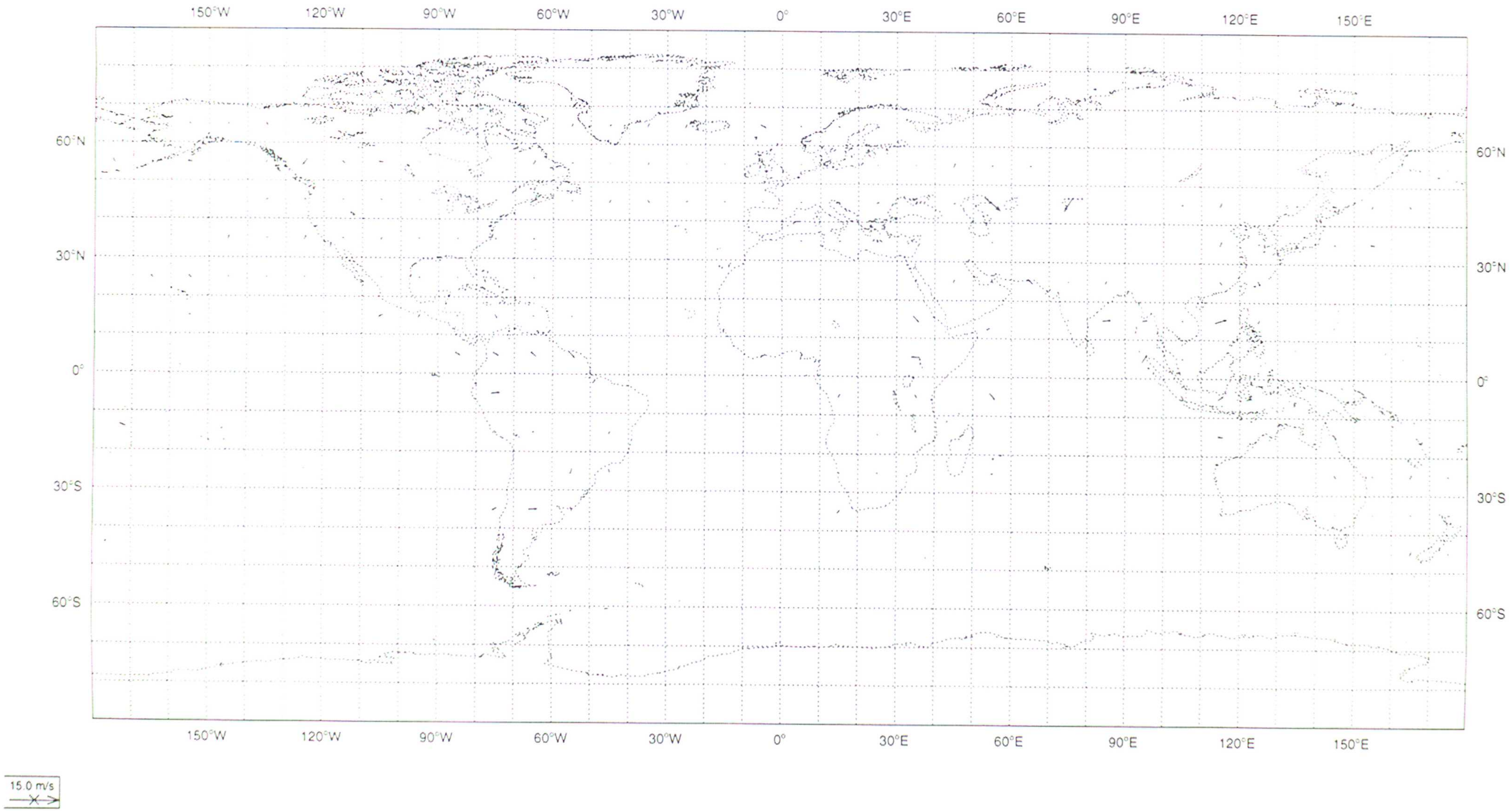
30°S
60°S
15.0 m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present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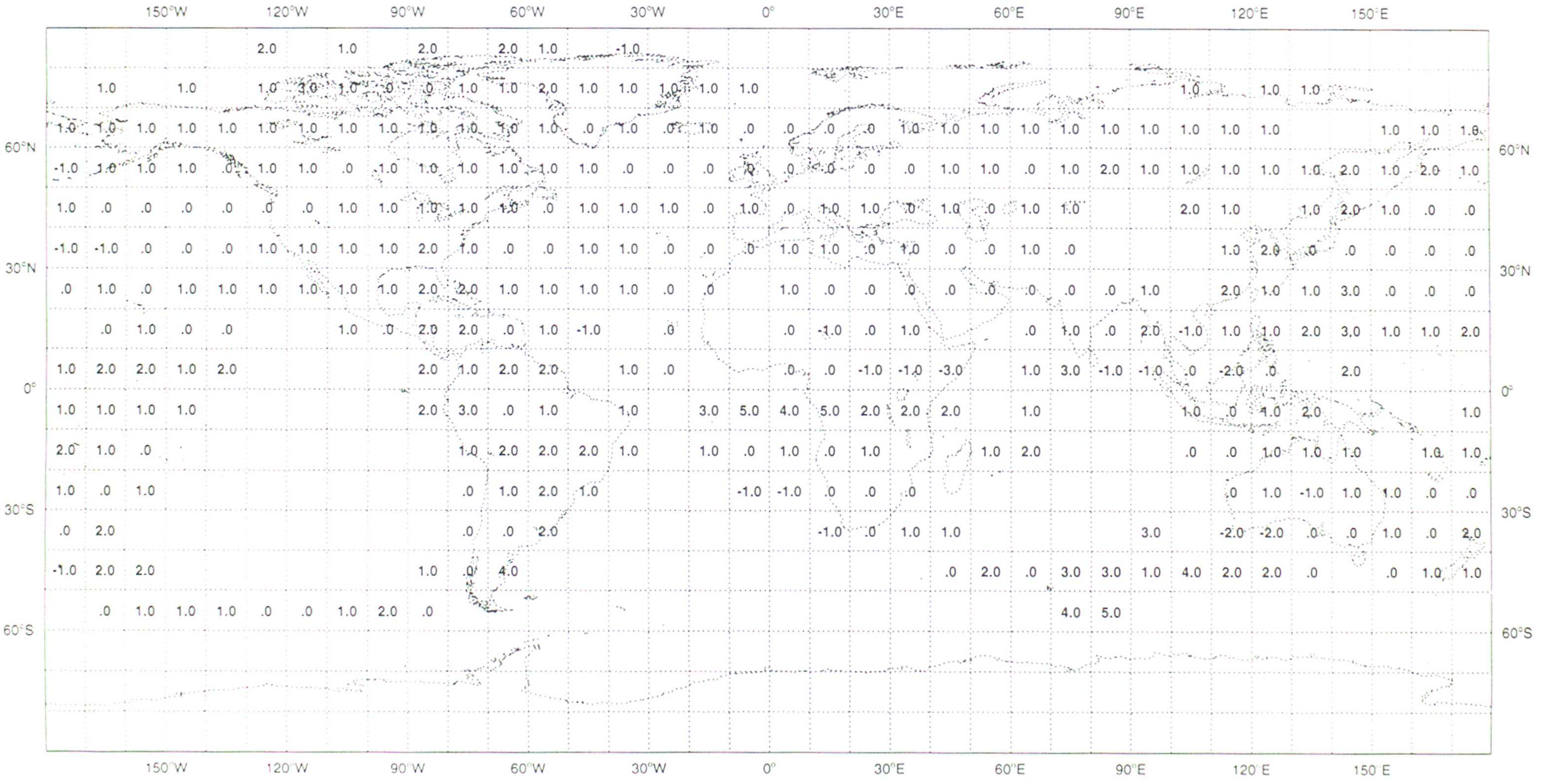
30°S
60°S
15.0 m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present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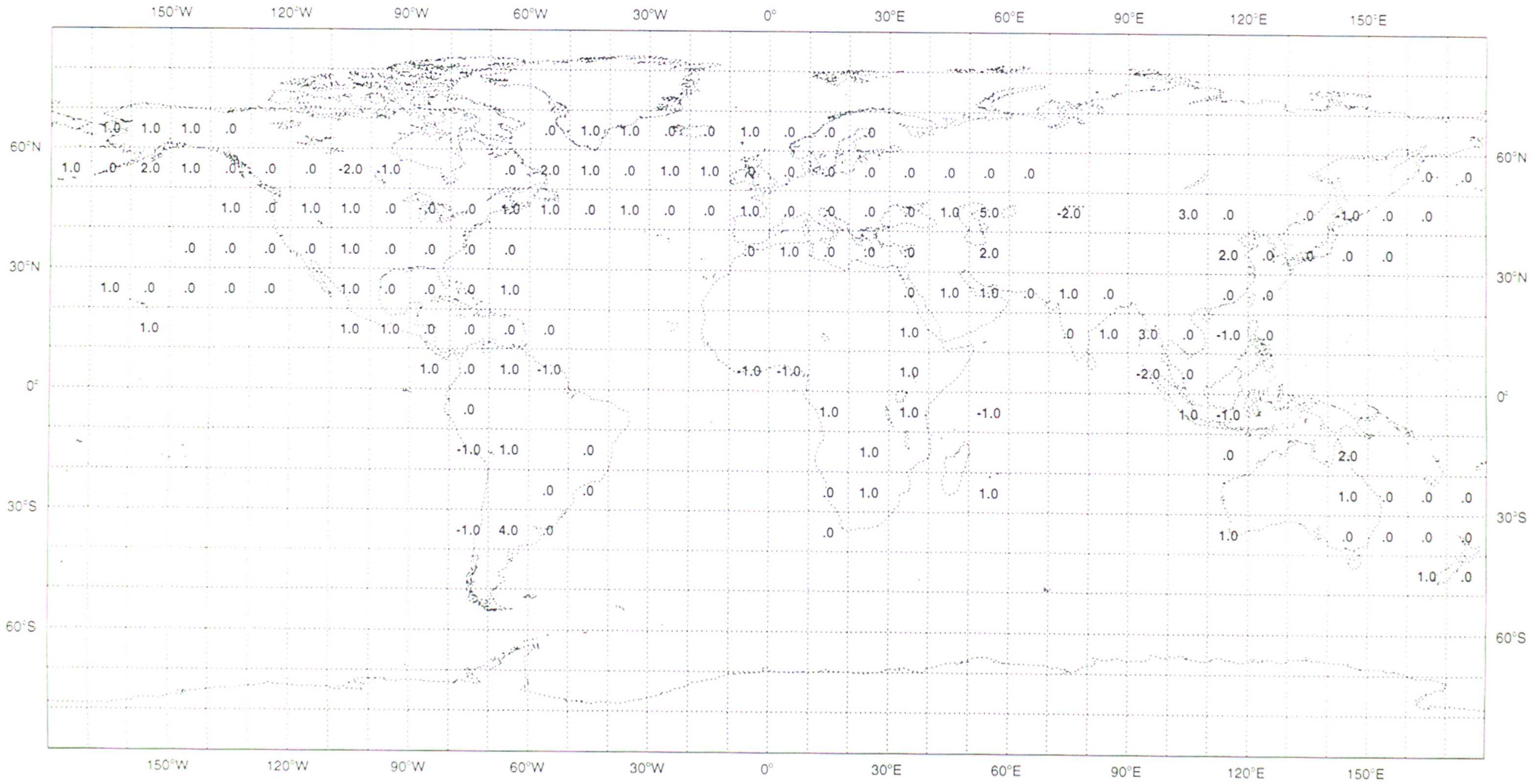
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present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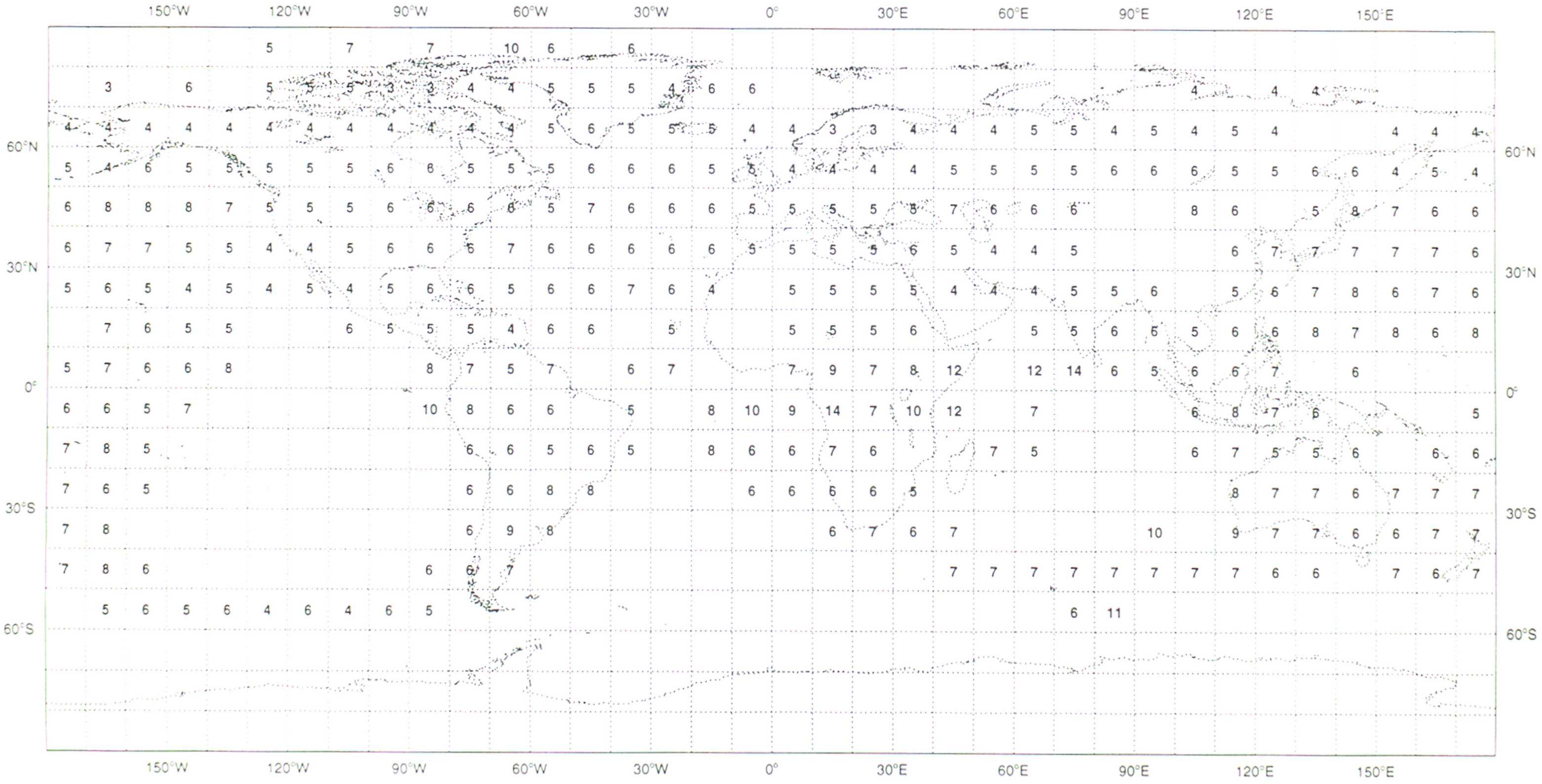
1.0 1.0 1.0 .0 .0 .0 .0 1.0 .0 1.0 3.0 .0 -1.0 .0
1.0 .0 1.0 -1.0 -1.0 -1.0 1.0 -2.0 .0
.0 1.0 1.0 -1.0 1.0 -1.0
-1.0 1.0 .0 1.0 .0 2.0
.0 .0 .0 1.0 1.0 1.0 .0 .0 .0
-1.0 4.0 .0 .0 1.0 .0 .0 .0 .0
1.0 .0

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present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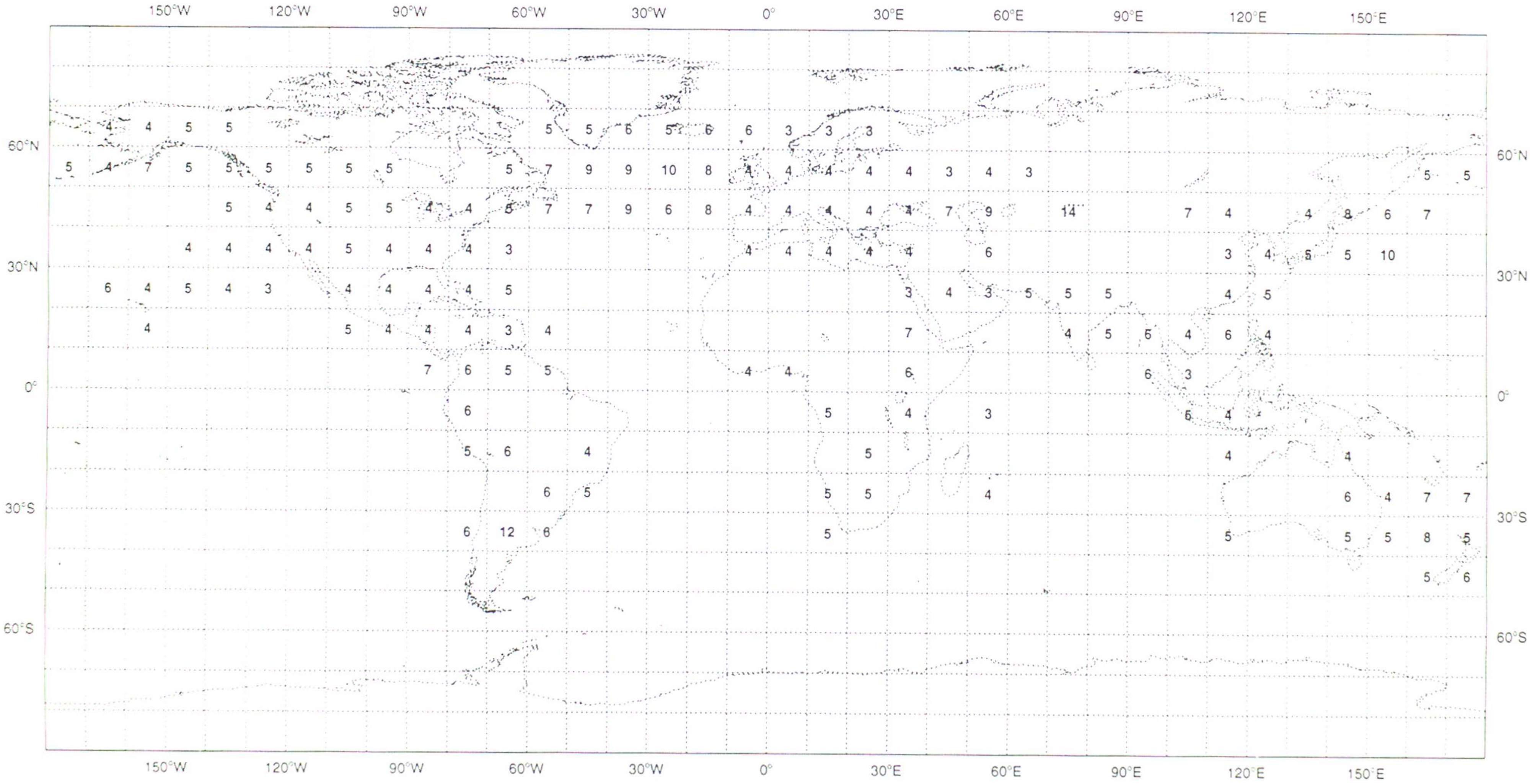
30°S
60°S

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). JUNE 2002
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present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5 4 7 5 5 5 5 5 5 5 7 9 9 10 8 4 4 4 4 4 3 4 3 5 5
5 4 4 5 5 4 4 5 7 7 9 6 8 4 4 4 4 4 7 9 14 7 4 4 8 6 7
4 4 4 4 5 4 4 4 3 4 4 4 4 4 6 3 4 5 5 10
6 4 5 4 3 4 4 4 4 5 3 4 3 5 5 5 4 5
4 5 4 4 4 3 4 7 4 5 5 4 6 4
7 6 5 5 4 4 6 6 3
6 5 4 3 6 4
5 6 4 5 4 4
6 5 5 5 4 6 4 7 7
6 12 6 5 5 5 5 8 5
5 6

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 30.0 hPa

Element monitored :GEOPOTENTIAL HEIGHT IN metres

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.1

SELECTION CRITERIA : $\geq$3 levels with $\geq$10 observations and $\geq$ 100 m weighted RMS.

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
31168	00	Z	250	56/ 138	13	0	22.8	85.5	88.5	5
33837	00	Z	50	46/ 31	18	0	48.8	142.9	151.0	6
34247	12	Z	50	50/ 41	27	0	69.7	170.8	184.5	6
40375	12	Z	30	28/ 37	23	0	54.4	223.2	229.7	4
40394	12	Z	1000	27/ 42	25	0	8.2	-45.3	46.0	5
40417	12	Z	50	26/ 50	20	0	46.9	195.9	201.4	5
40430	12	Z	50	25/ 40	14	0	30.7	199.7	202.1	6
40437	12	Z	50	25/ 47	17	0	26.9	188.9	190.8	4
41594	12	Z	150	32/ 73	8	0	78.1	75.6	108.7	4
42027	00	Z	250	34/ 75	11	0	89.7	-22.6	92.5	4
42027	12	Z	1000	34/ 75	11	0	37.1	-51.0	63.1	4
42101	00	Z	150	30/ 76	27	0	106.7	-8.4	107.0	4
42101	12	Z	50	30/ 76	18	1	85.5	201.1	218.5	8
42182	00	Z	50	29/ 77	15	0	99.1	179.5	205.0	4
42182	12	Z	50	29/ 77	14	2	81.6	217.4	232.2	7
42314	12	Z	400	27/ 95	10	0	75.5	31.9	81.9	5
42339	00	Z	70	26/ 73	15	2	94.5	193.1	215.0	6
42339	12	Z	70	26/ 73	10	2	106.8	242.1	264.6	8
42369	00	Z	30	27/ 81	8	5	65.4	334.7	341.1	8
42369	12	Z	50	27/ 81	10	3	96.2	241.9	260.3	8
42492	00	Z	50	26/ 85	13	0	108.5	205.8	232.7	5
42492	12	Z	70	26/ 85	10	0	80.2	154.7	174.3	8
42647	12	Z	150	23/ 73	17	1	76.4	133.9	154.1	8
42667	00	Z	200	23/ 77	14	0	98.4	19.9	100.4	4
42667	12	Z	200	23/ 77	17	1	95.9	74.4	121.4	6
42809	12	Z	50	23/ 88	16	0	101.6	139.3	172.4	5
42867	00	Z	50	21/ 79	10	0	105.1	139.3	174.5	5
43003	00	Z	150	19/ 73	18	1	126.8	-38.3	132.5	7
43014	00	Z	150	20/ 75	11	1	93.5	147.3	174.4	7
43014	12	Z	100	20/ 75	4	6	92.7	194.7	215.7	8
43128	00	Z	30	17/ 78	9	0	111.2	233.1	258.3	4
43192	00	Z	200	15/ 74	17	0	105.5	-39.7	112.8	6
43279	00	Z	150	13/ 80	27	0	83.9	-81.8	117.2	6
43295	00	Z	150	13/ 78	14	0	83.0	-77.8	113.7	5
43295	12	Z	200	13/ 78	14	0	96.1	-18.7	97.9	4
43333	00	Z	200	12/ 93	25	0	62.3	-70.2	93.8	5
43346	00	Z	150	11/ 80	25	2	85.8	-106.5	136.8	6
43369	00	Z	150	8/ 73	12	2	93.9	-113.0	146.9	4
43369	12	Z	150	8/ 73	12	1	128.2	-44.3	135.6	6
50527	00	Z	50	49/ 120	27	0	53.1	154.0	162.9	4
50527	12	Z	50	49/ 120	28	0	76.3	127.0	148.1	4
82332	12	Z	50	-3/ -60	4	0	20.9	165.2	166.6	4
82599	12	Z	50	-6/ -35	3	0	41.6	193.7	198.1	4
83612	12	Z	70	-20/ -55	15	0	64.4	149.1	162.5	4
83746	12	Z	50	-23/ -43	6	0	12.4	160.7	161.1	4
83840	12	Z	70	-26/ -49	3	0	67.0	172.0	184.6	5
91366	00	Z	50	9/ 168	24	0	93.5	171.5	195.3	6
91376	00	Z	50	7/ 171	30	0	42.8	167.7	173.1	4
96749	00	Z	50	-6/ 107	20	1	59.7	143.1	155.1	4

Figure 8. TEMP 500 hPa geopotential mean daily count. JUNE 2002

All hours

Global average number of observations in 24 hours = 1183

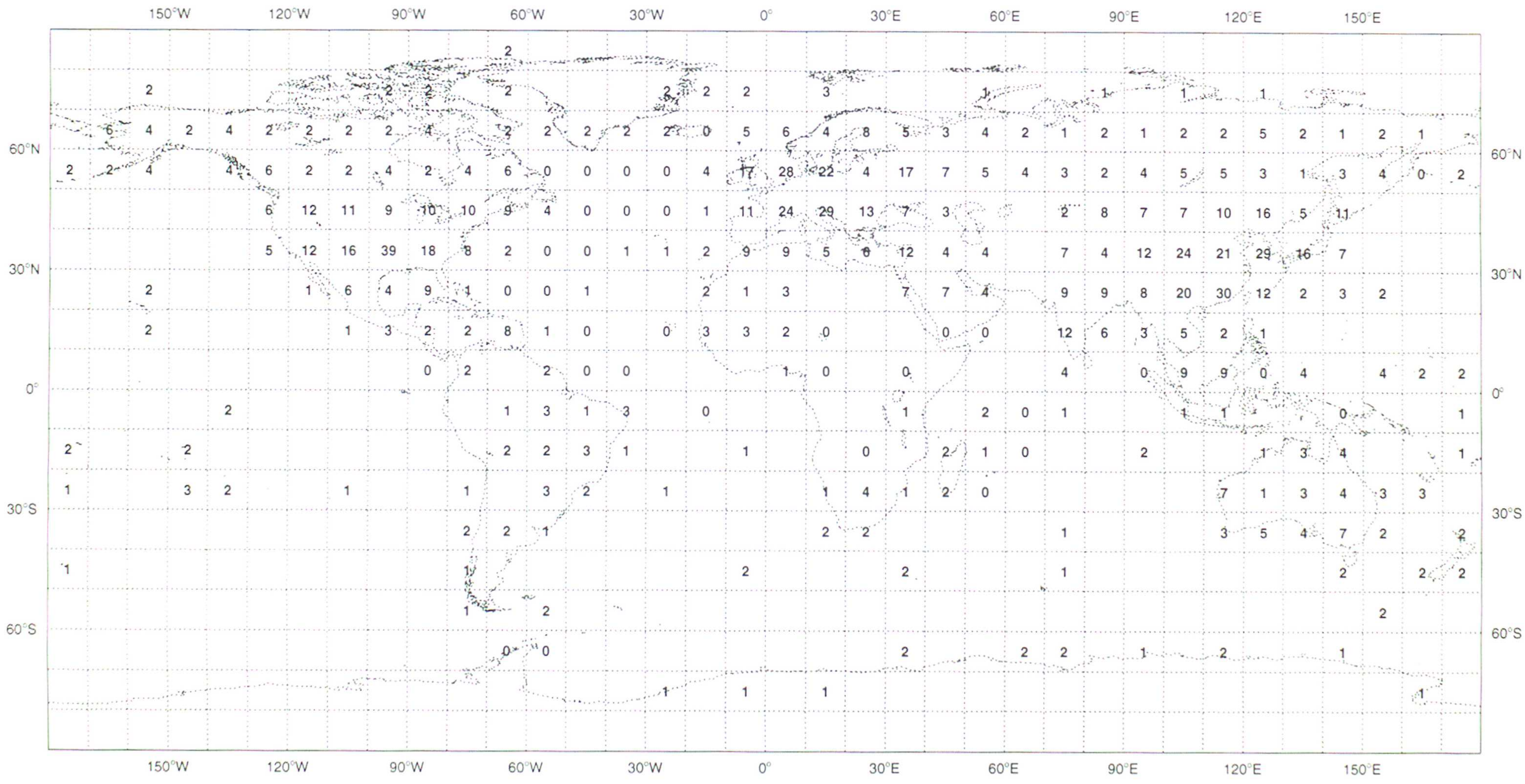
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TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

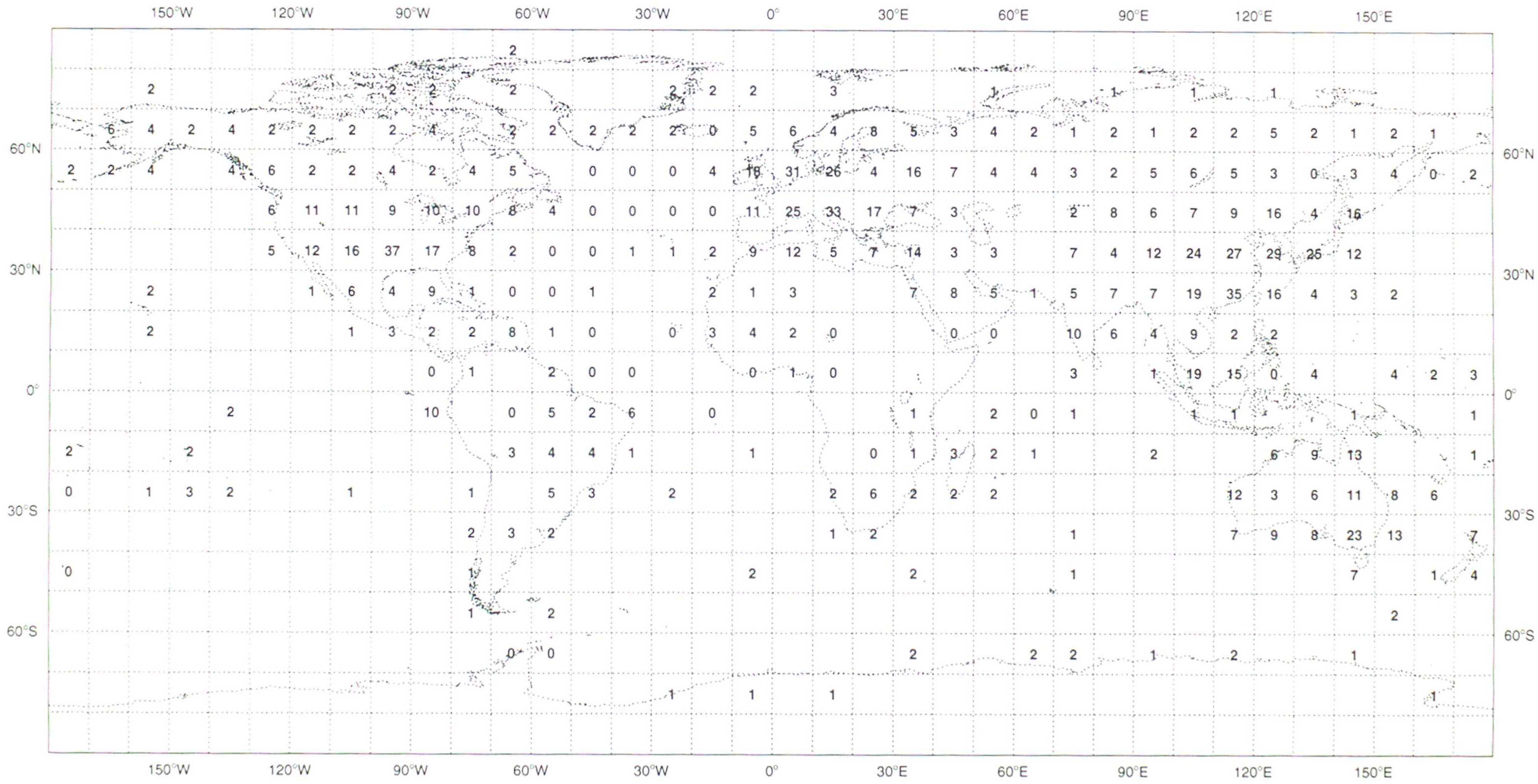
GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : ≥ 10 observations and ≥ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	100	-5/ -81	17	0	100	-6.1	2.6	22.7	3
PSPIU	12	V	150	-5/ -81	18	0	100	0.8	-2.1	23.5	2
17351	00	V	200	37/ 35	26	0	100	-10.0	2.2	16.4	2
38341	00	V	200	43/ 71	24	0	100	-3.3	-17.6	19.6	4
41594	12	V	100	32/ 73	9	0	100	15.1	3.0	17.9	2
43346	00	V	100	11/ 80	26	0	3	11.9	2.6	15.2	1
43369	12	V	150	8/ 73	12	0	58	0.6	-0.8	16.5	1
60419	12	V	250	36/ 7	10	0	100	5.9	-9.1	20.0	1
60566	12	V	200	32/ 4	10	0	0	-8.3	-3.6	17.8	1
63741	00	V	150	-1/ 37	28	0	100	12.1	3.1	23.2	1
68174	12	V	250	-24/ 29	10	0	100	-21.3	3.4	24.8	2
68263	12	V	250	-26/ 28	17	0	76	-10.4	4.6	19.4	1
68442	12	V	250	-29/ 26	13	0	100	-15.7	5.5	20.9	2
68461	12	V	100	-28/ 28	12	0	100	1.3	-1.2	25.7	5
68512	12	V	200	-30/ 18	23	0	100	-12.0	2.2	19.1	4
68842	12	V	300	-34/ 26	12	0	100	-10.2	-1.3	15.2	1
80398	12	V	300	-5/ -70	11	0	9	2.4	-3.5	15.9	1
96035	00	V	300	4/ 99	10	0	20	6.0	1.6	15.2	1
98223	00	V	100	18/ 121	19	0	100	-11.8	-2.9	15.6	1

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. JUNE 2002
All hours
Global average number of observations in 24 hours = 1374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2 2 2 2 2 2 2 3 1 1 1 1
6 4 2 4 2 2 2 2 4 2 2 2 2 2 0 5 6 4 8 5 3 4 2 1 2 1 2 2 5 2 1 2 1
2 2 4 4 6 2 2 4 2 4 5 0 0 0 4 10 31 26 4 16 7 4 4 3 2 5 6 5 3 0 3 4 0 2
6 11 11 9 10 10 8 4 0 0 0 0 11 25 33 17 7 3 2 8 6 7 9 16 4 16
5 12 16 37 17 8 2 0 0 1 1 2 9 12 5 7 14 3 3 7 4 12 24 27 29 25 12
2 1 6 4 9 1 0 0 1 2 1 3 7 8 5 1 5 7 7 19 35 16 4 3 2
2 1 3 2 2 8 1 0 0 3 4 2 0 0 0 10 6 4 9 2 2
0 1 2 0 0 0 1 0 3 1 19 15 0 4 4 2 3
2 10 0 5 2 6 0 1 2 0 1 1 1 1 1
2 2 3 4 4 1 1 0 1 3 2 1 2 6 9 13 1
0 1 3 2 1 1 5 3 2 2 6 2 2 2 12 3 6 11 8 6
2 3 2 1 2 1 7 9 8 23 13 7
0 1 2 2 1 7 1 4
1 2 2
0 0 2 2 2 1 2 1
1 1 1 1

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.

SELECTION CRITERIA

:NUM OBS ≥ 5, and
ABSOLUTE BIAS ≥ 10°, with
SD < 30°, and
MAX SPREAD < 10°

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
17351	00	DD	37/ 35	24	-10.1	4.7	12.1
31510	00	DD	51/ 127	24	-11.3	7.6	16.7
38341	00	DD	43/ 71	24	38.0	6.5	14.5
42339	12	DD	26/ 73	11	15.7	7.4	24.9
42397	12	DD	27/ 88	7	13.8	4.4	20.0
59134	00	DD	24/ 118	20	10.8	5.5	14.2
59134	12	DD	24/ 118	21	11.2	7.7	19.7
62337	12	DD	31/ 34	27	-14.4	2.5	9.0

MONITORING OF SATELLITE WINDS

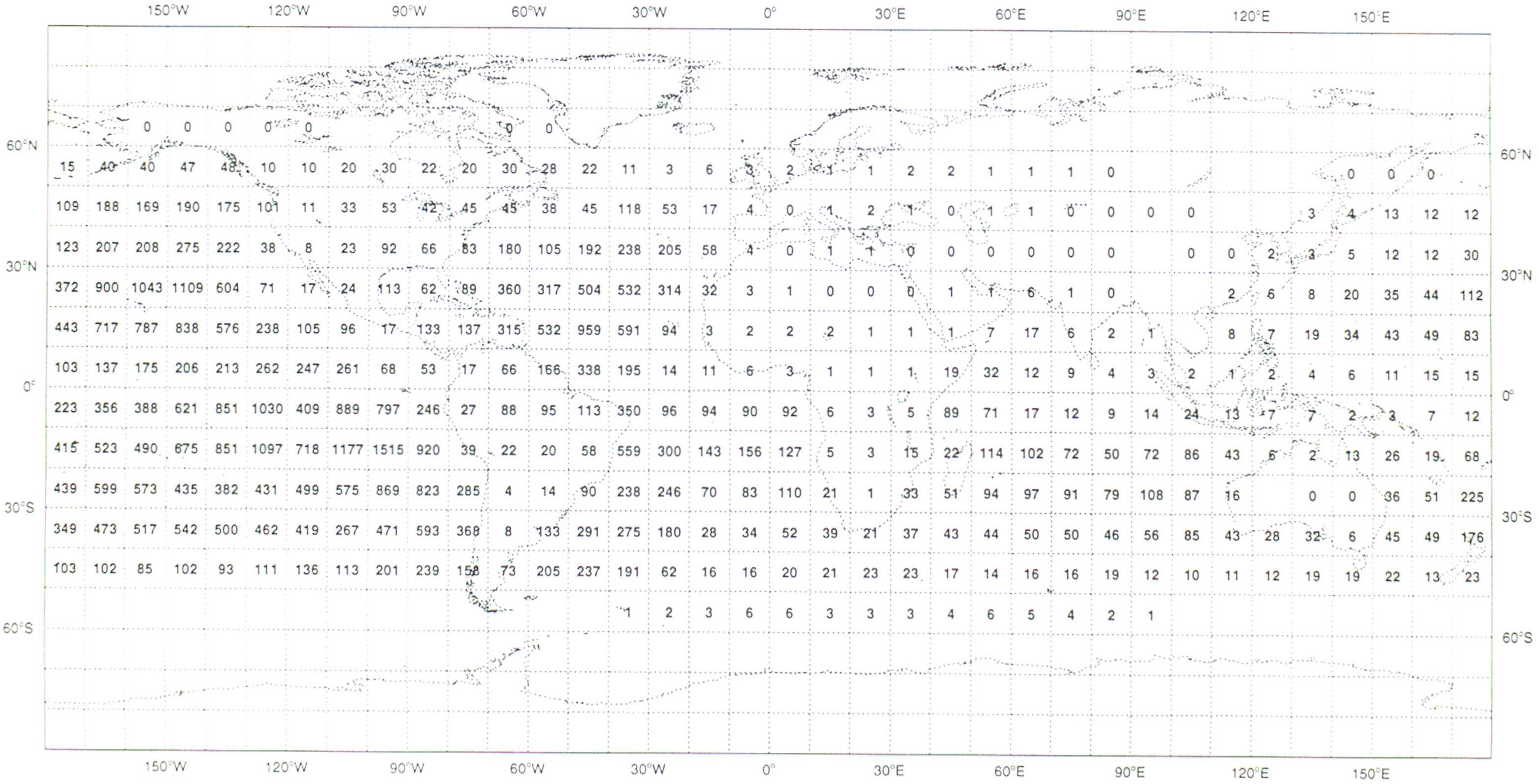
MONITORING CENTRE: BRACKNELL

MONTH: June 2002

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.
Standard of comparison	:Background field from UKMO global model.
Selection Criteria	:number of observations > 10.
Data Extracted	:Layer 701 - 1000 hPa 401 - 700 hPa 101 - 400 hPa
	:Mean wind
	:Mean observation minus background vector wind differences
	:Mean observation minus background speed differences
	:RMS of observation minus background vector differences

Figure 10. SATOB 701 - 1000 hPa mean daily count. JUNE 2002
Global average number of observations in 24 hours = 55391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0 0 0 0 0 0 0
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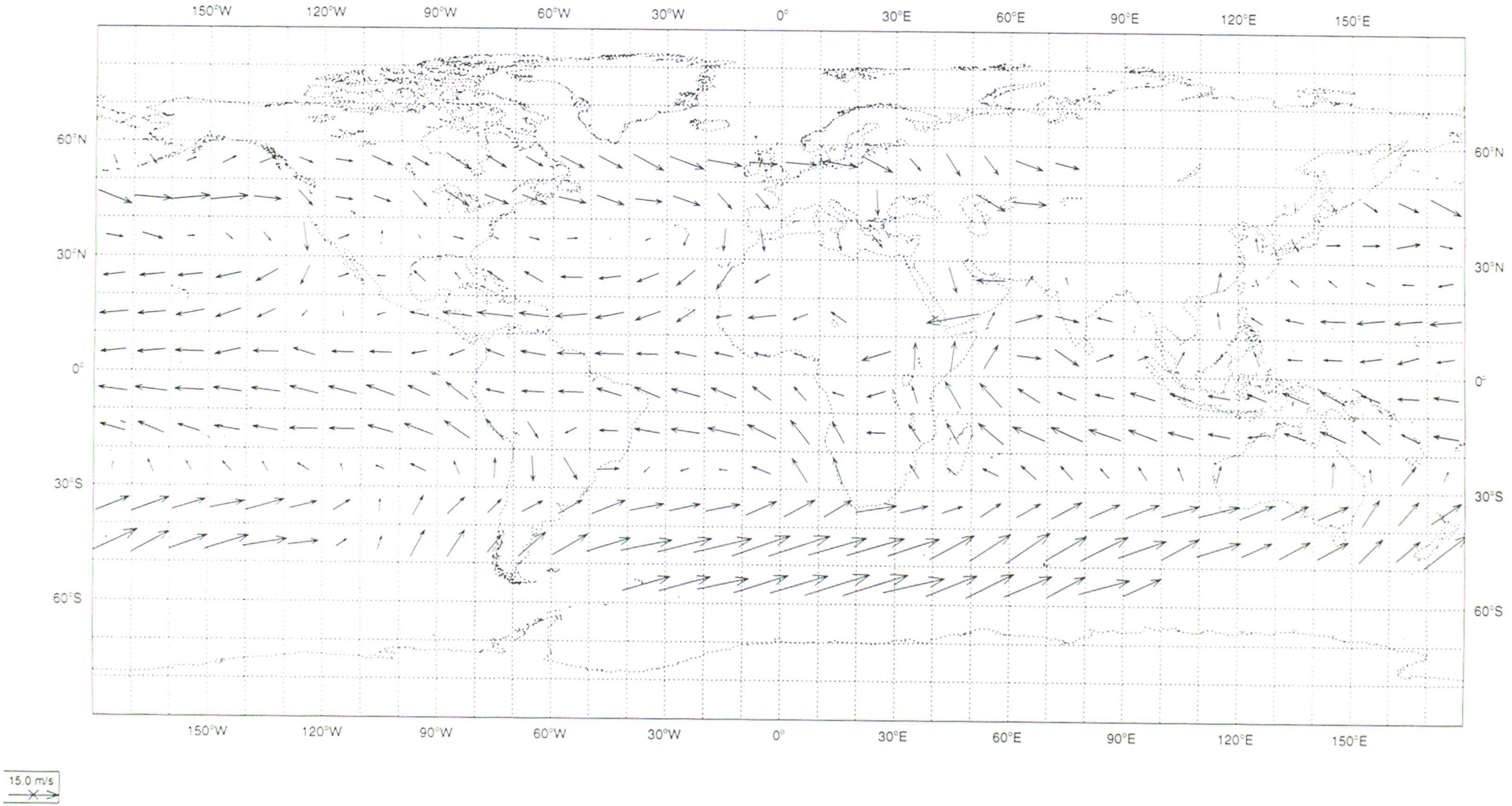
109 188 169 190 175 101 11 33 53 42 45 45 38 45 118 53 17 4 0 1 2 1 0 1 1 0 0 0 0 3 4 13 12 12
123 207 208 275 222 38 8 23 92 66 83 180 105 192 238 205 58 4 0 1 1 0 0 0 0 0 0 0 0 2 3 5 12 12 30
372 900 1043 1109 604 71 17 24 113 62 89 360 317 504 532 314 32 3 1 0 0 0 1 1 6 1 0 2 6 8 20 35 44 112
443 717 787 838 576 238 105 96 17 133 137 315 532 959 591 94 3 2 2 2 1 1 1 7 17 6 2 1 8 7 19 34 43 49 83
103 137 175 206 213 262 247 261 68 53 17 66 166 338 195 14 11 6 3 1 1 1 19 32 12 9 4 3 2 1 2 4 6 11 15 15
223 356 388 621 851 1030 409 889 797 246 27 88 95 113 350 96 94 90 92 6 3 5 89 71 17 12 9 14 24 13 7 7 2 3 7 12
415 523 490 675 851 1097 718 1177 1515 920 39 22 20 58 559 300 143 156 127 5 3 15 22 114 102 72 50 72 86 43 6 2 13 26 19 68
439 599 573 435 382 431 499 575 869 823 285 4 14 90 238 246 70 83 110 21 1 33 51 94 97 91 79 108 87 16 0 0 36 51 225
349 473 517 542 500 462 419 267 471 593 368 8 133 291 275 180 28 34 52 39 21 37 43 44 50 50 46 56 85 43 28 32 6 45 49 176
103 102 85 102 93 111 136 113 201 239 158 73 205 237 191 62 16 16 20 21 23 23 17 14 16 16 19 12 10 11 12 19 19 22 13 23
1 2 3 6 6 3 3 3 4 6 5 4 2 1

Figure 11. SATOB 701 - 1000 hPa vector mean wind. JUNE 2002
All observations
Arrows are plotted where greater than 10 obs are present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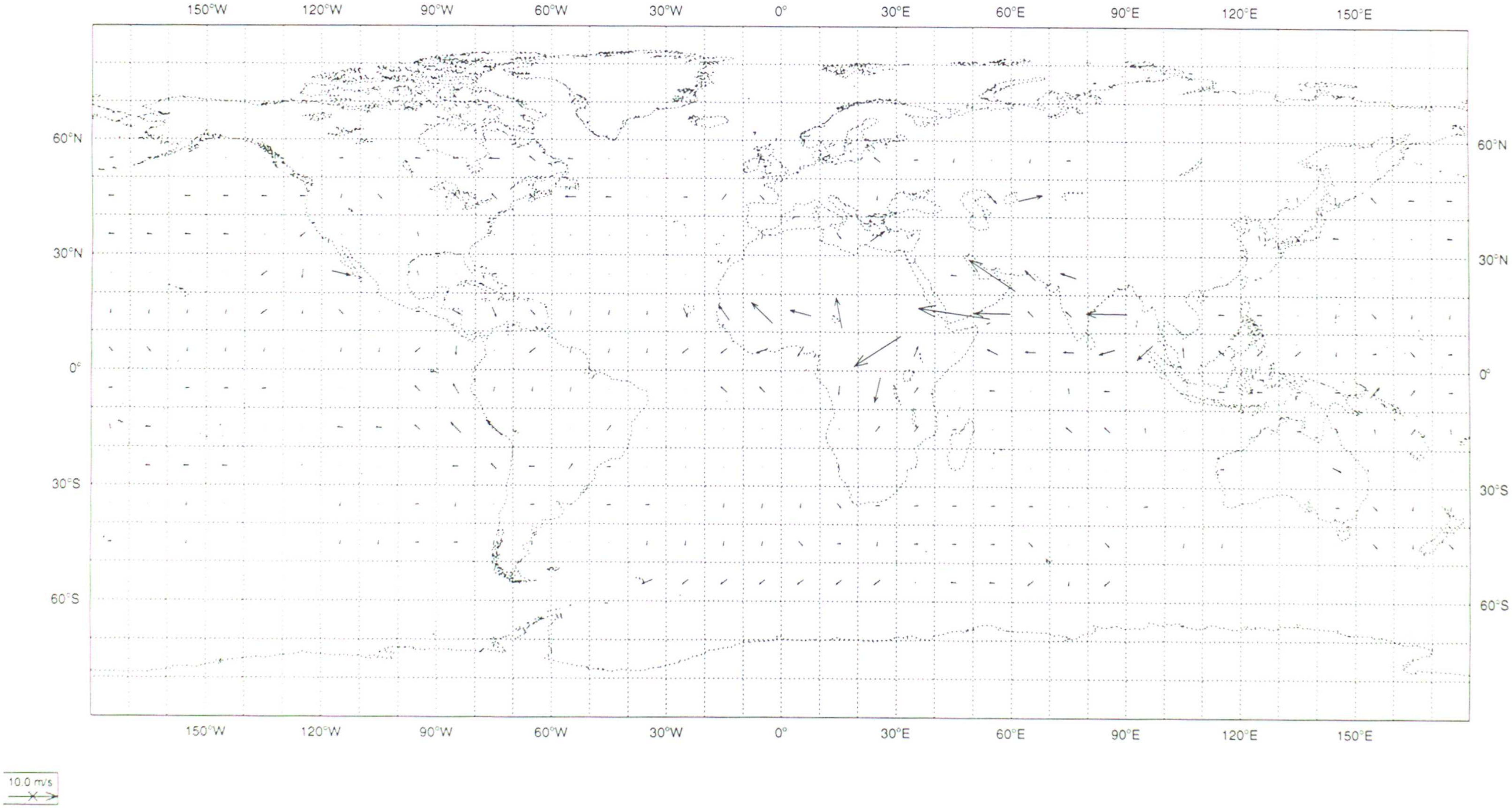
60°S
15.0 m/s

Figure 12. SATOB 701 - 1000 hPa vector wind differences. JUNE 2002

All observations

Arrows are plotted where greater than 10 obs are present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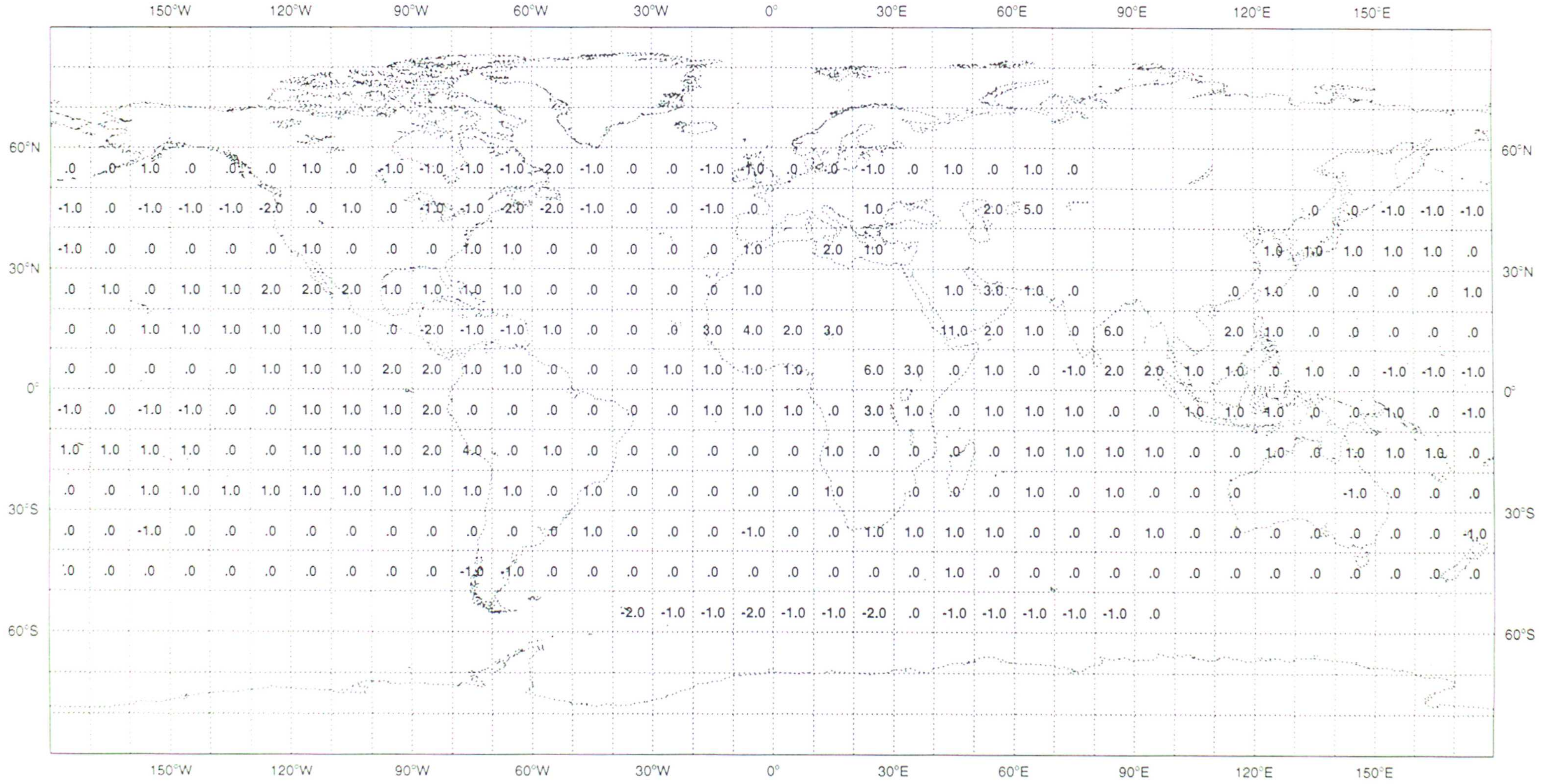
0°
30°S
60°S
10.0 m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). JUNE 2002
All observations
Values are plotted where greater than 10 obs are present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30°S
60°S
.0 .0 1.0 .0 .0 .0 1.0 .0 -1.0 -1.0 -1.0 -1.0 -2.0 -1.0 .0 .0 -1.0 -1.0 .0 .0 -1.0 .0 1.0 .0 1.0 .0
-1.0 .0 -1.0 -1.0 -1.0 -2.0 .0 1.0 .0 -1.0 -1.0 -2.0 -2.0 -1.0 .0 .0 -1.0 .0 1.0 2.0 5.0 .0 .0 -1.0 -1.0 -1.0
-1.0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 1.0 1.0 .0 .0 .0 .0 .0 1.0 2.0 1.0 1.0 1.0 1.0 1.0 1.0 .0
.0 1.0 .0 1.0 1.0 2.0 2.0 2.0 1.0 1.0 1.0 1.0 .0 .0 .0 .0 .0 1.0 1.0 3.0 1.0 .0 .0 1.0 .0 .0 .0 .0 1.0
.0 .0 1.0 1.0 1.0 1.0 1.0 1.0 .0 -2.0 -1.0 -1.0 1.0 .0 .0 .0 3.0 4.0 2.0 3.0 11.0 2.0 1.0 .0 6.0 2.0 1.0 .0 .0 .0 .0 .0
.0 .0 .0 .0 .0 1.0 1.0 1.0 2.0 2.0 1.0 1.0 .0 .0 .0 1.0 1.0 1.0 1.0 6.0 3.0 .0 1.0 .0 -1.0 2.0 2.0 1.0 1.0 .0 1.0 .0 -1.0 -1.0 -1.0
-1.0 .0 -1.0 -1.0 .0 .0 1.0 1.0 1.0 2.0 .0 .0 .0 .0 .0 .0 1.0 1.0 1.0 .0 3.0 1.0 .0 1.0 1.0 1.0 .0 .0 1.0 1.0 1.0 .0 .0 1.0 .0 -1.0
1.0 1.0 1.0 1.0 .0 .0 1.0 1.0 1.0 2.0 4.0 .0 1.0 .0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 .0 1.0 1.0 1.0 1.0 .0 .0 1.0 .0 1.0 1.0 1.0 .0
.0 .0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .0 1.0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 1.0 .0 1.0 .0 .0 .0 -1.0 .0 .0 .0
.0 .0 -1.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 -1.0 .0 .0 1.0 1.0 1.0 1.0 .0 .0 .0 1.0 .0 .0 .0 .0 .0 .0 .0 -1.0
.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 -1.0 -1.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0
-2.0 -1.0 -1.0 -2.0 -1.0 -1.0 -2.0 .0 -1.0 -1.0 -1.0 -1.0 -1.0 .0

Figure 14. SATOB 701 - 1000 hPa RMS O-B vector differences (ms-1). JUNE 2002

All observations

Values are plotted where greater than 10 obs are present

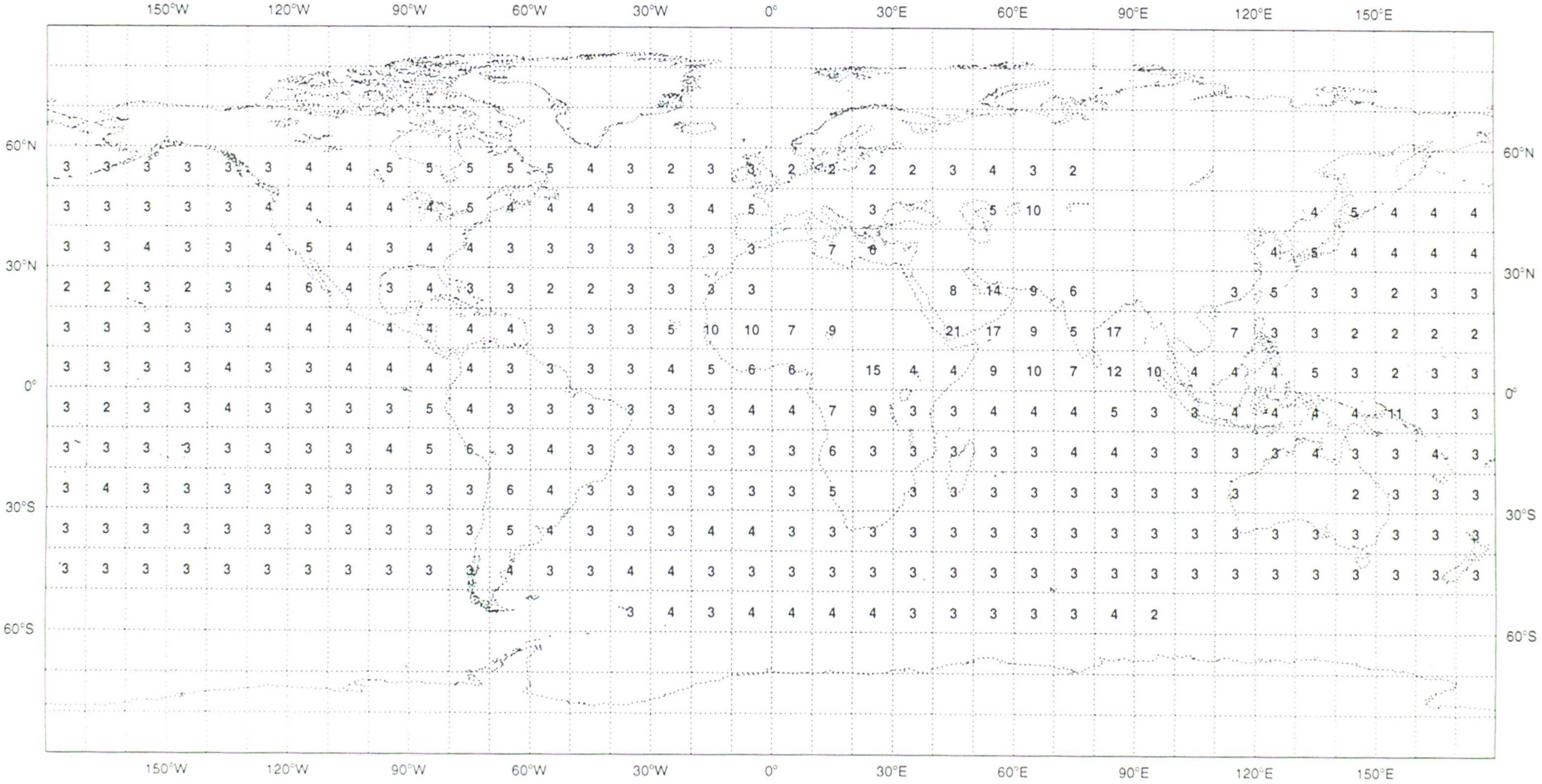
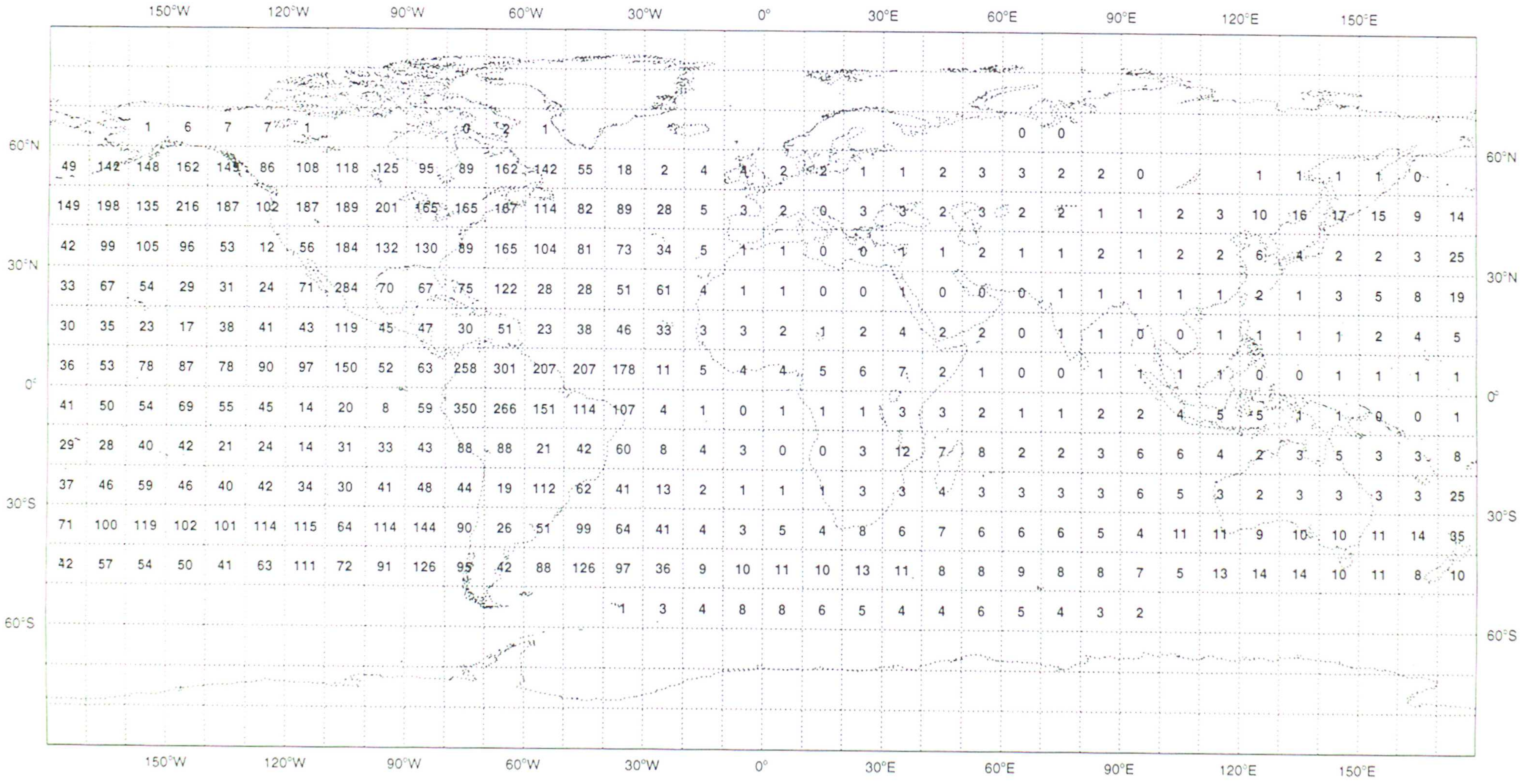

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
3 3 3 3 3 3 4 4 5 5 5 5 5 4 3 2 3 3 2 2 2 2 3 4 3 2
3 3 3 3 3 4 4 4 4 4 5 4 4 4 3 3 4 5 3 5 10 4 5 4 4 4
3 3 4 3 3 4 5 4 3 4 4 3 3 3 3 3 3 3 7 6 4 5 4 4 4 4
2 2 3 2 3 4 6 4 3 4 3 3 2 2 3 3 3 3 8 14 9 6 3 5 3 3 2 3 3
3 3 3 3 3 4 4 4 4 4 4 4 3 3 3 5 10 10 7 9 21 17 9 5 17 7 3 3 2 2 2 2
3 3 3 3 4 3 3 4 4 4 4 3 3 3 3 4 5 6 6 15 4 4 9 10 7 12 10 4 4 4 5 3 2 3 3
3 2 3 3 4 3 3 3 3 5 4 3 3 3 3 3 3 4 4 7 9 3 3 4 4 4 5 3 3 4 4 4 4 11 3 3
3 3 3 3 3 3 3 3 4 5 6 3 4 3 3 3 3 3 3 6 3 3 3 3 3 4 4 3 3 3 3 4 3 3 4 3
3 4 3 3 3 3 3 3 3 3 3 6 4 3 3 3 3 3 3 5 3 3 3 3 3 3 3 3 3 2 3 3 3
3 3 3 3 3 3 3 3 3 3 3 5 4 3 3 3 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 3 3 3 3 3 3 3 3 3 3 4 3 3 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
3 4 3 4 4 4 4 3 3 3 3 3 4 2

Figure 15. SATOB 401 - 700 hPa mean daily count. JUNE 2002
Global average number of observations in 24 hours = 15510



		1	6	7	7	1				0	2	1												0	0										
49	142	148	162	145	86	108	118	125	95	89	162	142	55	18	2	4	4	2	2	1	1	2	3	3	2	2	0			1	1	1	1	0	
149	198	135	216	187	102	187	189	201	165	165	167	114	82	89	28	5	3	2	0	3	3	2	3	2	2	1	1	2	3	10	16	17	15	9	14
42	99	105	96	53	12	56	184	132	130	89	165	104	81	73	34	5	1	1	0	0	1	1	2	1	1	2	1	2	2	6	4	2	2	3	25
33	67	54	29	31	24	71	284	70	67	75	122	28	28	51	61	4	1	1	0	0	1	0	0	0	1	1	1	1	1	2	1	3	5	8	19
30	35	23	17	38	41	43	119	45	47	30	51	23	38	46	33	3	3	2	1	2	4	2	2	0	1	1	0	0	1	1	1	1	2	4	5
36	53	78	87	78	90	97	150	52	63	258	301	207	207	178	11	5	4	4	5	6	7	2	1	0	0	1	1	1	1	0	0	1	1	1	1
41	50	54	69	55	45	14	20	8	59	350	266	151	114	107	4	1	0	1	1	1	3	3	2	1	1	2	2	4	5	5	1	1	0	0	1
29	28	40	42	21	24	14	31	33	43	88	88	21	42	60	8	4	3	0	0	3	12	7	8	2	2	3	6	6	4	2	3	5	3	3	8
37	46	59	46	40	42	34	30	41	48	44	19	112	62	41	13	2	1	1	1	3	3	4	3	3	3	3	3	6	5	3	2	3	3	3	25
71	100	119	102	101	114	115	64	114	144	90	26	51	99	64	41	4	3	5	4	8	6	7	6	6	6	5	4	11	11	9	10	10	11	14	35
42	57	54	50	41	63	111	72	91	126	95	42	88	126	97	36	9	10	11	10	13	11	8	8	9	8	8	7	5	13	14	14	10	11	8	10
														1	3	4	8	8	6	5	4	4	6	5	4	3	2								

Figure 16. SATOB 401 - 700 hPa vector mean wind. JUNE 2002
All observations
Arrows are plotted where greater than 10 obs are present

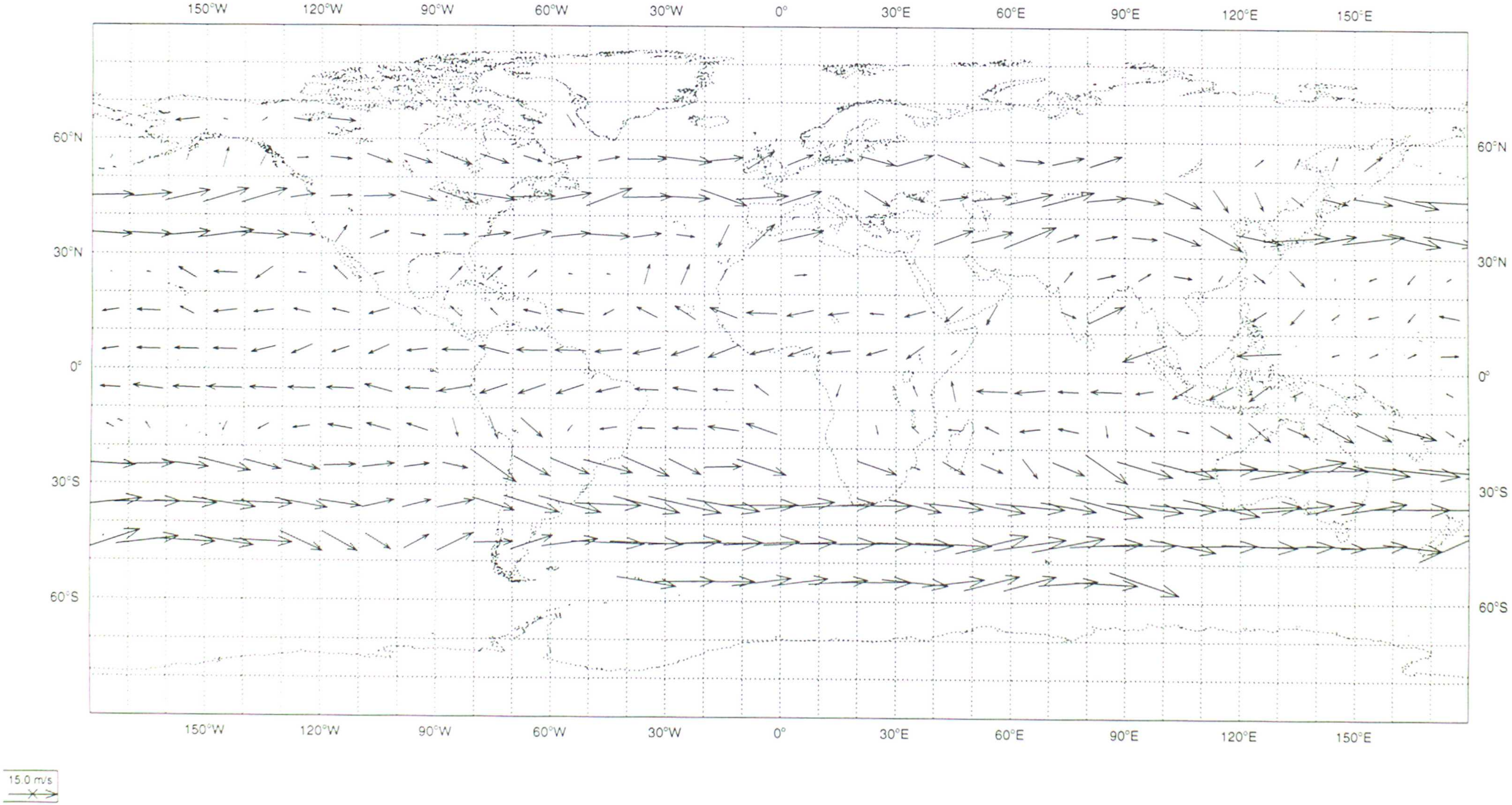

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 17. SATOB 401 - 700 hPa vector wind differences. JUNE 2002
All observations
Arrows are plotted where greater than 10 obs are present

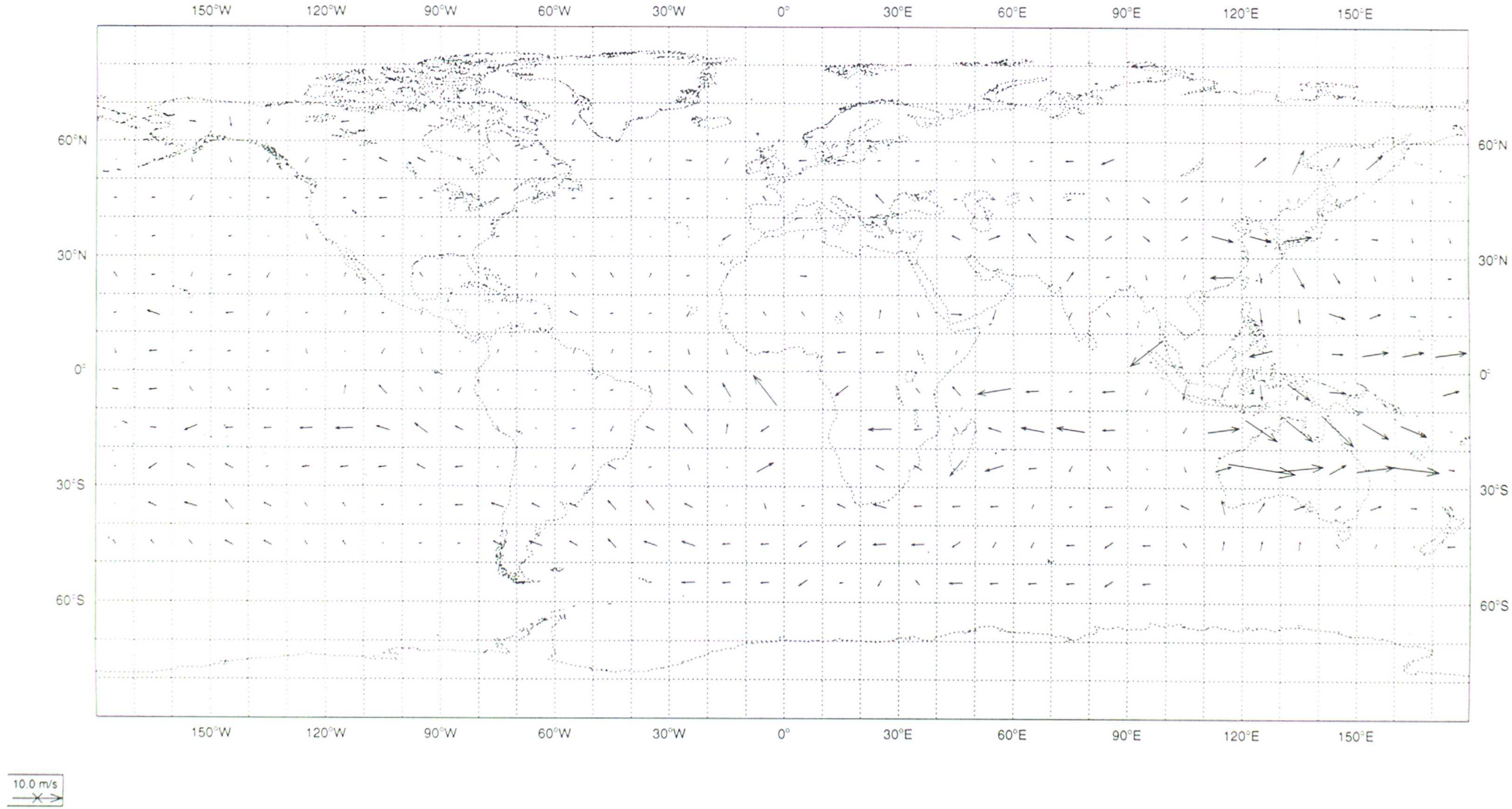

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). JUNE 2002

All observations

Values are plotted where greater than 10 obs are present

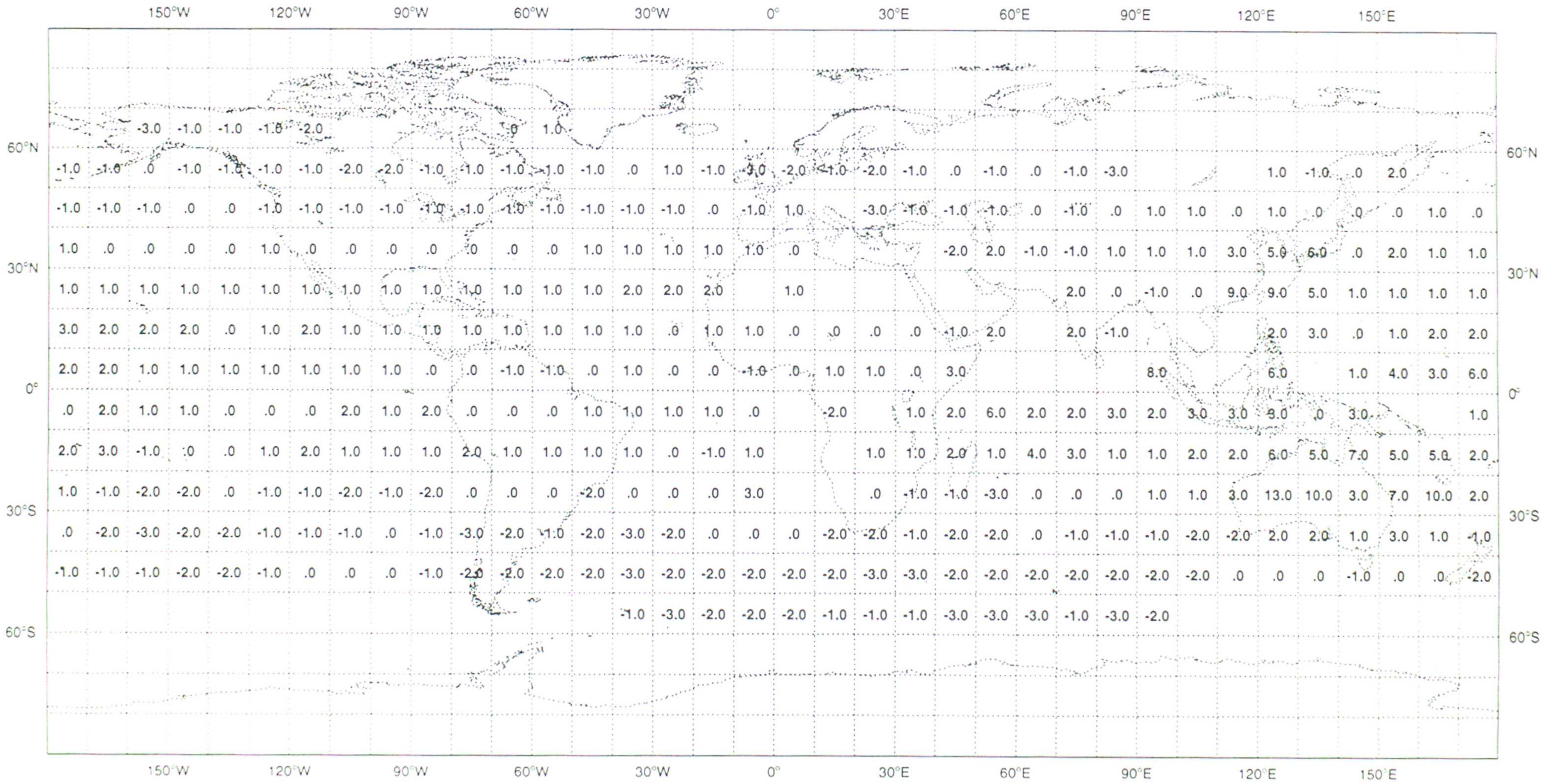

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-3.0 -1.0 -1.0 -1.0 -2.0 .0 1.0
-1.0 -1.0 .0 -1.0 -1.0 -1.0 -1.0 -2.0 -2.0 -1.0 -1.0 -1.0 -1.0 -1.0 .0 1.0 -1.0 -3.0 -2.0 -1.0 -2.0 -1.0 .0 -1.0 .0 -1.0 -3.0 1.0 -1.0 .0 2.0
-1.0 -1.0 -1.0 .0 .0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 -1.0 .0 -1.0 1.0 -3.0 -1.0 -1.0 -1.0 .0 -1.0 .0 1.0 1.0 .0 1.0 .0 .0 .0 1.0 .0
1.0 .0 .0 .0 .0 1.0 .0 .0 .0 .0 .0 .0 .0 1.0 1.0 1.0 1.0 1.0 .0 -2.0 2.0 -1.0 -1.0 1.0 1.0 1.0 3.0 5.0 6.0 .0 2.0 1.0 1.0
1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 1.0 2.0 .0 -1.0 .0 9.0 9.0 5.0 1.0 1.0 1.0 1.0
3.0 2.0 2.0 2.0 .0 1.0 2.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .0 1.0 1.0 .0 .0 .0 .0 -1.0 2.0 2.0 -1.0 2.0 3.0 .0 1.0 2.0 2.0
2.0 2.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .0 .0 -1.0 -1.0 .0 1.0 .0 .0 -1.0 .0 1.0 1.0 .0 3.0 8.0 6.0 1.0 4.0 3.0 6.0
.0 2.0 1.0 1.0 .0 .0 .0 2.0 1.0 2.0 .0 .0 .0 1.0 1.0 1.0 1.0 .0 -2.0 1.0 2.0 6.0 2.0 2.0 3.0 2.0 3.0 3.0 3.0 .0 3.0 1.0
2.0 3.0 -1.0 .0 .0 1.0 2.0 1.0 1.0 1.0 2.0 1.0 1.0 1.0 1.0 .0 -1.0 1.0 1.0 1.0 2.0 1.0 4.0 3.0 1.0 1.0 2.0 2.0 6.0 5.0 7.0 5.0 5.0 2.0
1.0 -1.0 -2.0 -2.0 .0 -1.0 -1.0 -2.0 -1.0 -2.0 .0 .0 .0 -2.0 .0 .0 .0 3.0 .0 -1.0 -1.0 -3.0 .0 .0 .0 1.0 1.0 3.0 13.0 10.0 3.0 7.0 10.0 2.0
.0 -2.0 -3.0 -2.0 -2.0 -1.0 -1.0 -1.0 .0 -1.0 -3.0 -2.0 -1.0 -2.0 -3.0 -2.0 .0 .0 .0 -2.0 -2.0 -1.0 -2.0 -2.0 .0 -1.0 -1.0 -1.0 -2.0 -2.0 2.0 2.0 1.0 3.0 1.0 -1.0
-1.0 -1.0 -1.0 -2.0 -2.0 -1.0 .0 .0 .0 -1.0 -2.0 -2.0 -2.0 -2.0 -3.0 -2.0 -2.0 -2.0 -2.0 -2.0 -3.0 -3.0 -2.0 -2.0 -2.0 -2.0 -2.0 -2.0 -2.0 .0 .0 .0 -1.0 .0 .0 -2.0
-1.0 -3.0 -2.0 -2.0 -2.0 -1.0 -1.0 -1.0 -3.0 -3.0 -3.0 -1.0 -3.0 -2.0

Figure 19. SATOB 401 - 700 hPa RMS O-B vector differences (ms-1). JUNE 2002
All observations
Values are plotted where greater than 10 obs are present

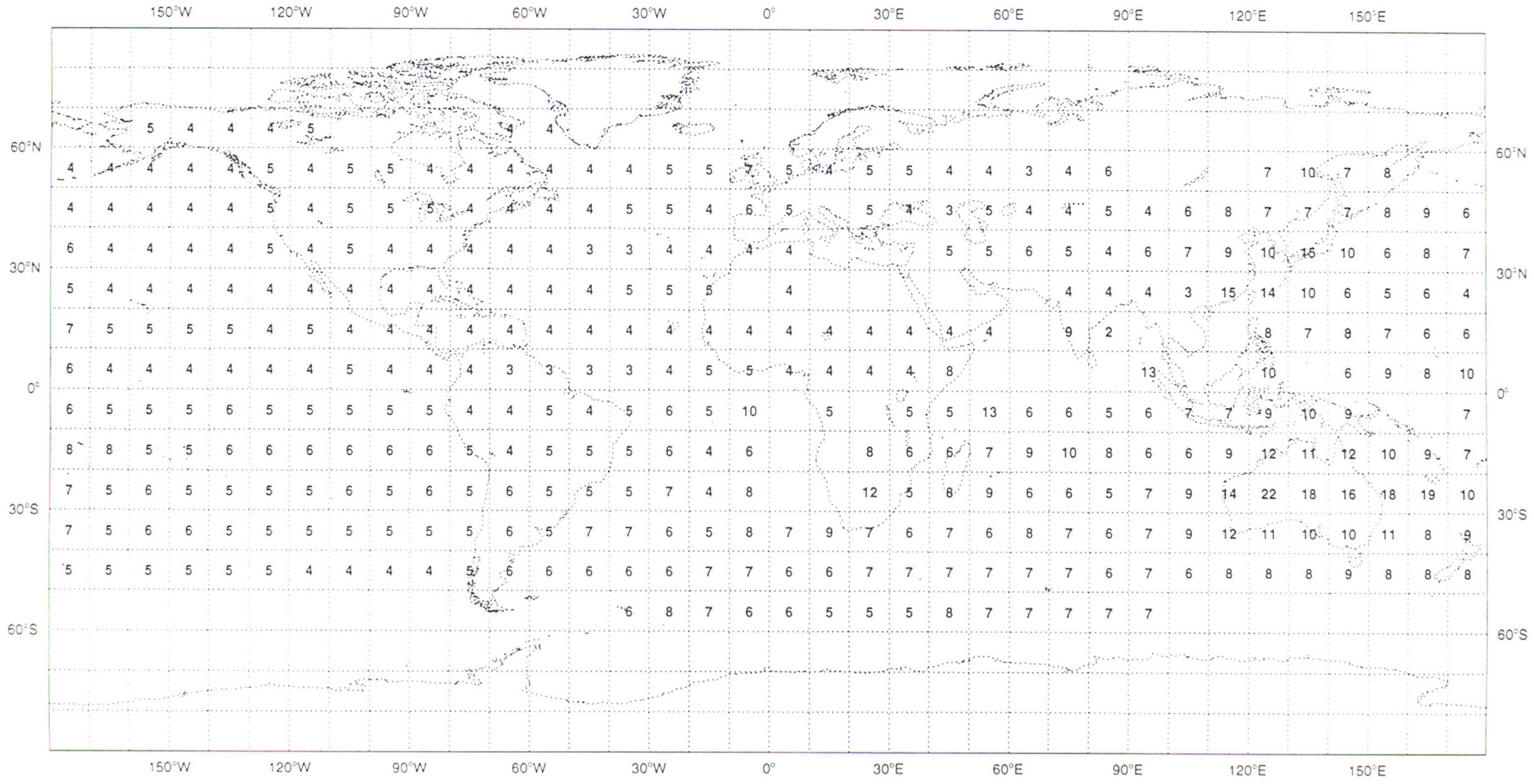

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5 4 4 4 5 4 4
4 4 4 4 4 5 4 5 5 4 4 4 4 4 4 5 5 7 5 4 5 5 4 4 3 4 6 7 10 7 8
4 4 4 4 4 5 4 5 5 5 4 4 4 4 5 5 4 6 5 5 4 3 5 4 4 5 4 6 8 7 7 7 8 9 6
6 4 4 4 4 5 4 5 4 4 4 4 4 3 3 4 4 4 4 5 5 6 5 4 6 7 9 10 15 10 6 8 7
5 4 4 4 4 4 4 4 4 4 4 4 4 4 5 5 5 4 4 4 4 3 15 14 10 6 5 6 4
7 5 5 5 5 4 5 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 9 2 8 7 8 7 6 6
6 4 4 4 4 4 4 5 4 4 4 3 3 3 3 4 5 5 4 4 4 4 8 13 10 6 9 8 10
6 5 5 5 6 5 5 5 5 5 4 4 5 4 5 6 5 10 5 5 5 13 6 6 5 6 7 7 9 10 9 7
8 8 5 5 6 6 6 6 6 6 5 4 5 5 5 6 4 6 8 6 6 7 9 10 8 6 6 9 12 11 12 10 9 7
7 5 6 5 5 5 5 6 5 6 5 6 5 5 5 7 4 8 12 5 8 9 6 6 5 7 9 14 22 18 16 18 19 10
7 5 6 6 5 5 5 5 5 5 5 6 5 7 7 6 5 8 7 9 7 6 7 6 8 7 6 7 9 12 11 10 10 11 8 9
5 5 5 5 5 5 4 4 4 4 5 6 6 6 6 6 7 7 6 6 7 7 7 7 7 7 6 7 6 8 8 8 9 8 8 8
6 8 7 6 6 5 5 5 8 7 7 7 7 7

Figure 20. SATOB 101 - 400 hPa mean daily count. JUNE 2002
Global average number of observations in 24 hours = 74557

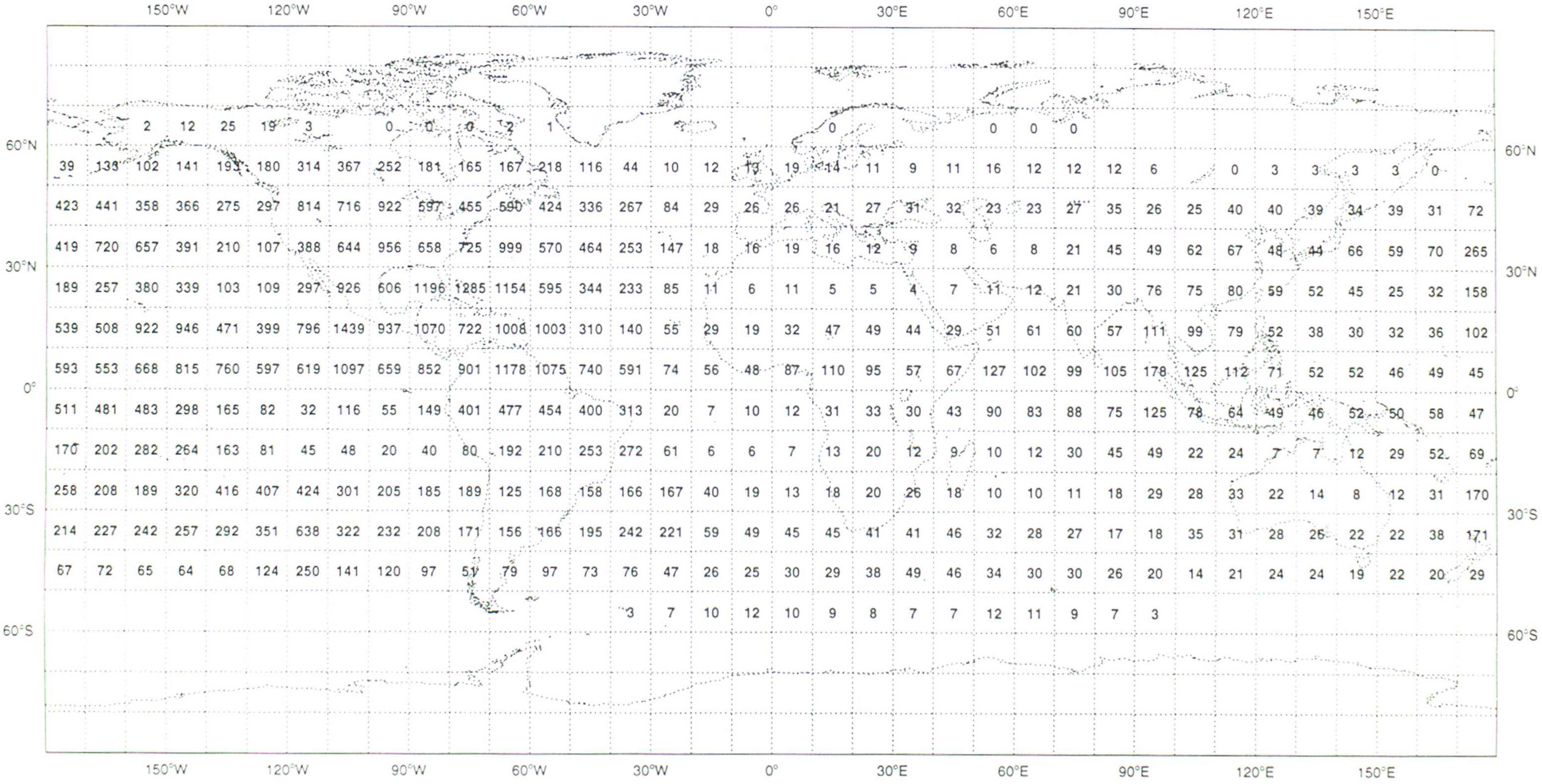

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
2 12 25 19 3 0 0 0 2 1 0 0 0 0
39 133 102 141 193 180 314 367 252 181 165 167 218 116 44 10 12 13 19 14 11 9 11 16 12 12 12 6 0 3 3 3 3 0
423 441 358 366 275 297 814 716 922 597 455 590 424 336 267 84 29 26 26 21 27 31 32 23 23 27 35 26 25 40 40 39 34 39 31 72
419 720 657 391 210 107 388 644 956 658 725 999 570 464 253 147 18 16 19 16 12 9 8 6 8 21 45 49 62 67 48 44 66 59 70 265
189 257 380 339 103 109 297 926 606 1196 1285 1154 595 344 233 85 11 6 11 5 5 4 7 11 12 21 30 76 75 80 59 52 45 25 32 158
539 508 922 946 471 399 796 1439 937 1070 722 1008 1003 310 140 55 29 19 32 47 49 44 29 51 61 60 57 111 99 79 52 38 30 32 36 102
593 553 668 815 760 597 619 1097 659 852 901 1178 1075 740 591 74 56 48 87 110 95 57 67 127 102 99 105 178 125 112 71 52 52 46 49 45
511 481 483 298 165 82 32 116 55 149 401 477 454 400 313 20 7 10 12 31 33 30 43 90 83 88 75 125 78 64 49 46 52 50 58 47
170 202 282 264 163 81 45 48 20 40 80 192 210 253 272 61 6 6 7 13 20 12 9 10 12 30 45 49 22 24 7 7 12 29 52 69
258 208 189 320 416 407 424 301 205 185 189 125 168 158 166 167 40 19 13 18 20 26 18 10 10 11 18 29 28 33 22 14 8 12 31 170
214 227 242 257 292 351 638 322 232 208 171 156 166 195 242 221 59 49 45 45 41 41 46 32 28 27 17 18 35 31 28 26 22 22 38 171
67 72 65 64 68 124 250 141 120 97 51 79 97 73 76 47 26 25 30 29 38 49 46 34 30 30 26 20 14 21 24 24 19 22 20 29
3 7 10 12 10 9 8 7 7 12 11 9 7 3

Figure 21. SATOB 101 - 400 hPa vector mean wind. JUNE 2002
All observations
Arrows are plotted where greater than 10 obs are present

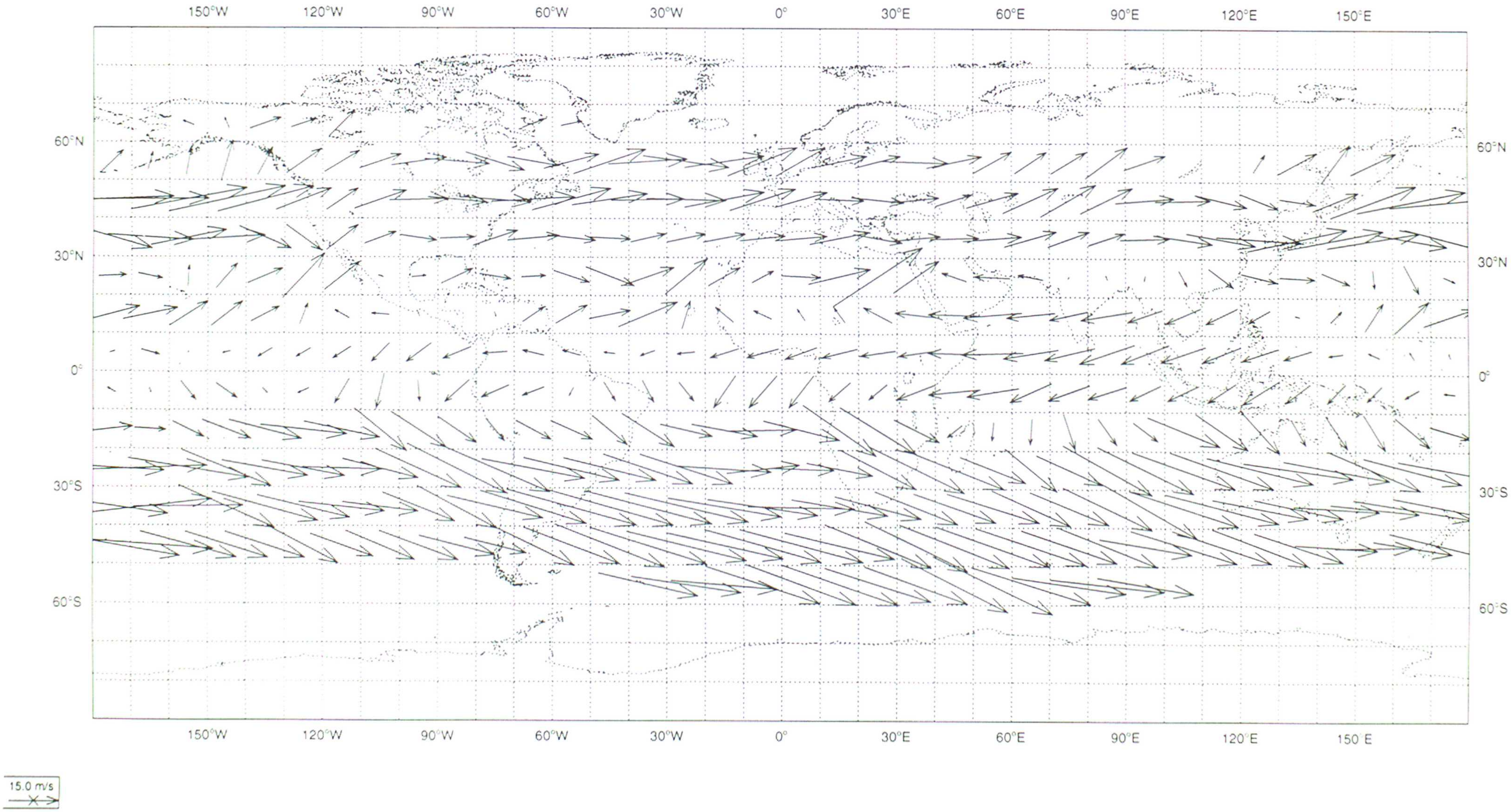

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0 m/s

Figure 22. SATOB 101 - 400 hPa vector wind differences. JUNE 2002
All observations
Arrows are plotted where greater than 10 obs are present

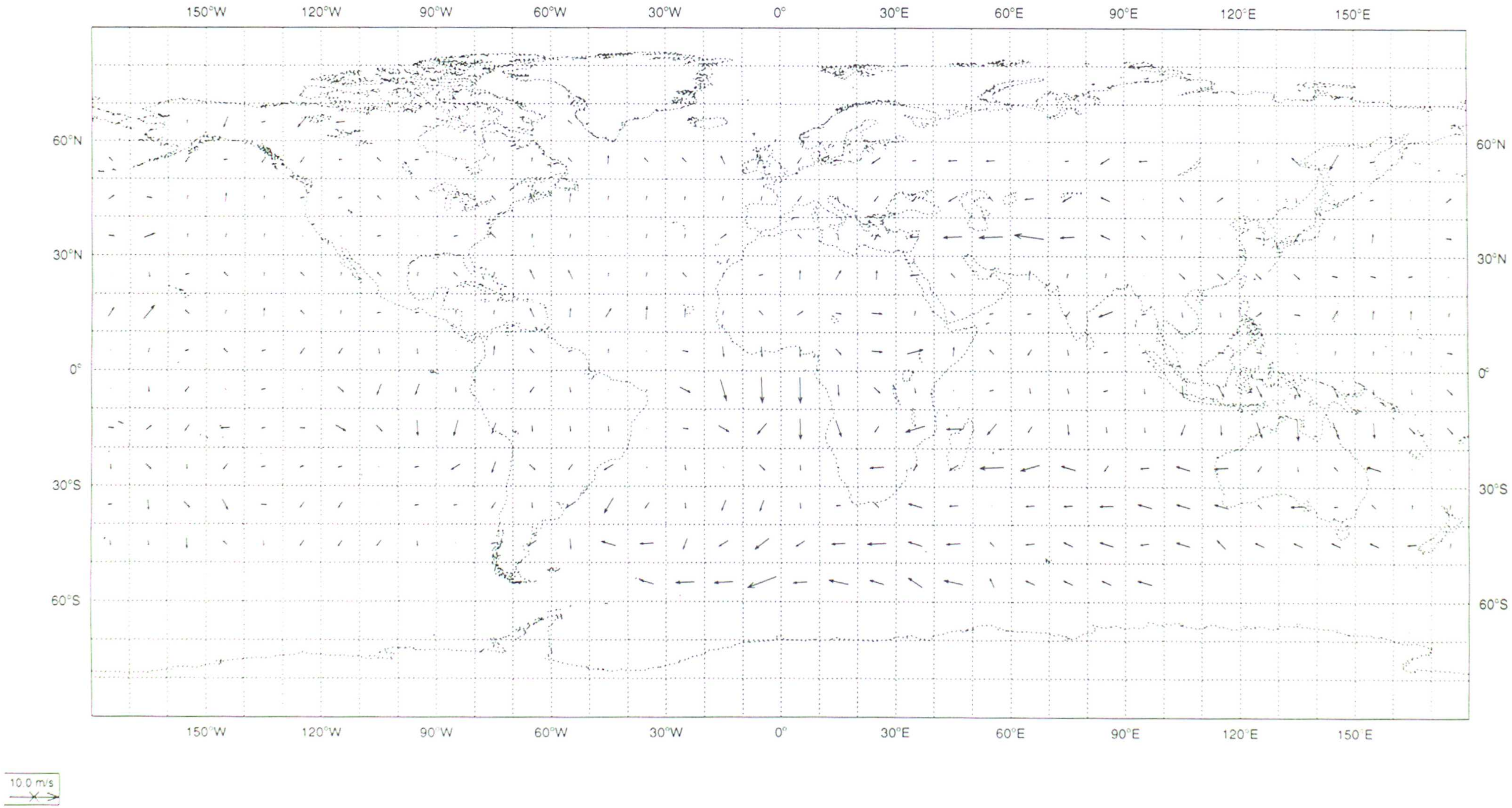

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0 m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). JUNE 2002

All observations

Values are plotted where greater than 10 obs are present

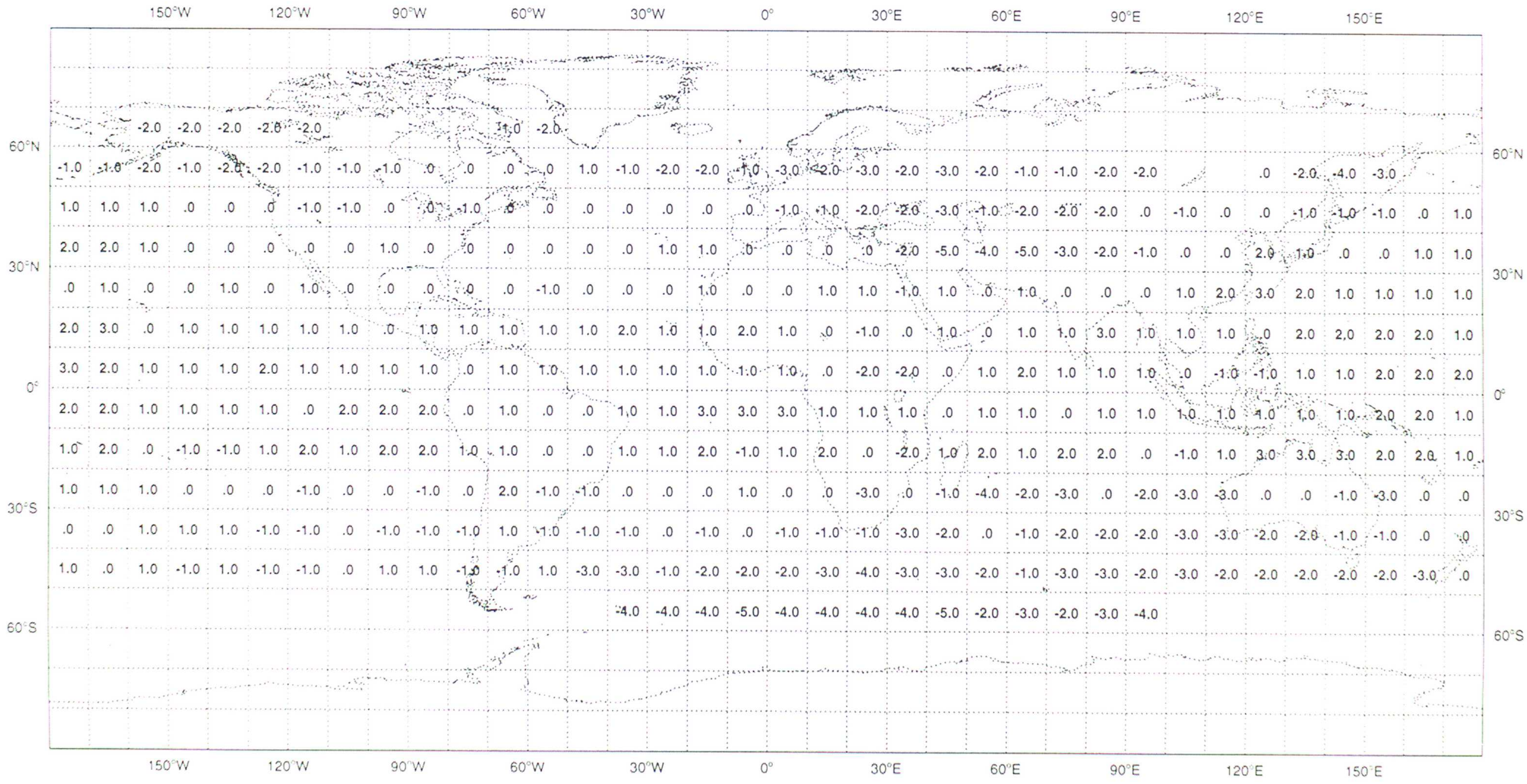
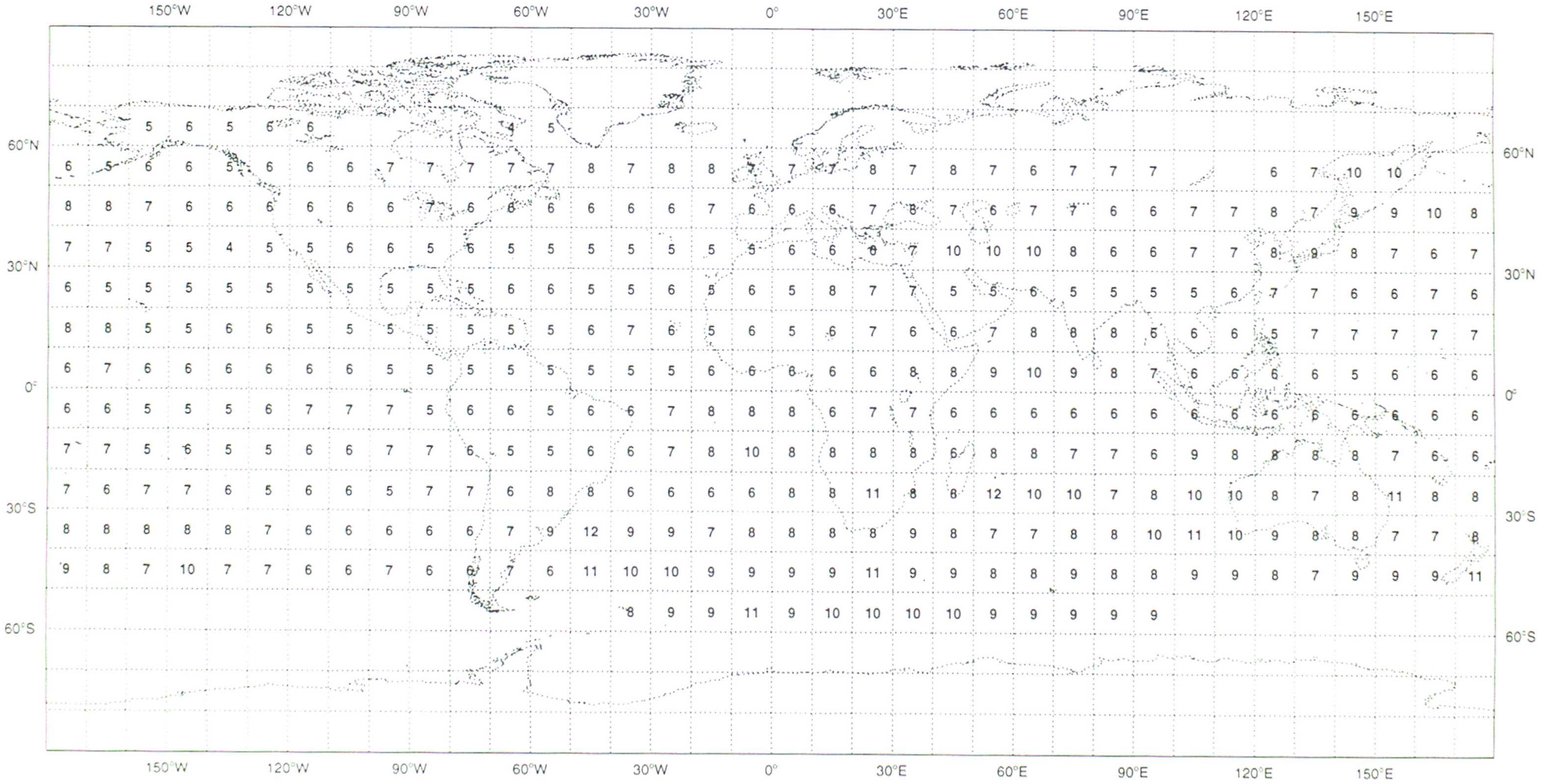

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-2.0 -2.0 -2.0 -2.0 -2.0 1.0 -2.0
-1.0 -1.0 -2.0 -1.0 -2.0 -2.0 -1.0 -1.0 -1.0 .0 .0 .0 .0 1.0 -1.0 -2.0 -2.0 -1.0 -3.0 -2.0 -3.0 -2.0 -3.0 -2.0 -1.0 -1.0 -2.0 -2.0 .0 -2.0 -4.0 -3.0
1.0 1.0 1.0 .0 .0 .0 -1.0 -1.0 .0 .0 -1.0 .0 .0 .0 .0 .0 .0 .0 -1.0 -1.0 -2.0 -2.0 -3.0 -1.0 -2.0 -2.0 -2.0 .0 -1.0 .0 .0 -1.0 -1.0 -1.0 .0 1.0
2.0 2.0 1.0 .0 .0 .0 .0 .0 1.0 .0 .0 .0 .0 .0 .0 1.0 1.0 .0 .0 .0 .0 -2.0 -5.0 -4.0 -5.0 -3.0 -2.0 -1.0 .0 .0 2.0 1.0 .0 .0 1.0 1.0
.0 1.0 .0 .0 1.0 .0 1.0 .0 .0 .0 .0 .0 -1.0 .0 .0 .0 1.0 .0 .0 1.0 1.0 -1.0 1.0 .0 1.0 .0 .0 .0 1.0 2.0 3.0 2.0 1.0 1.0 1.0 1.0
2.0 3.0 .0 1.0 1.0 1.0 1.0 1.0 .0 1.0 1.0 1.0 1.0 1.0 2.0 1.0 1.0 2.0 1.0 .0 -1.0 .0 1.0 .0 1.0 1.0 3.0 1.0 1.0 1.0 .0 2.0 2.0 2.0 2.0 1.0
3.0 2.0 1.0 1.0 1.0 2.0 1.0 1.0 1.0 1.0 .0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 .0 -2.0 -2.0 .0 1.0 2.0 1.0 1.0 1.0 .0 -1.0 -1.0 1.0 1.0 2.0 2.0 2.0
2.0 2.0 1.0 1.0 1.0 1.0 .0 2.0 2.0 2.0 .0 1.0 .0 .0 1.0 1.0 3.0 3.0 3.0 1.0 1.0 1.0 .0 1.0 1.0 .0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 1.0
1.0 2.0 .0 -1.0 -1.0 1.0 2.0 1.0 2.0 2.0 1.0 1.0 .0 .0 1.0 1.0 2.0 -1.0 1.0 2.0 .0 -2.0 1.0 2.0 1.0 2.0 2.0 .0 -1.0 1.0 3.0 3.0 3.0 2.0 2.0 1.0
1.0 1.0 1.0 .0 .0 .0 -1.0 .0 .0 -1.0 .0 2.0 -1.0 -1.0 .0 .0 .0 1.0 .0 .0 -3.0 .0 -1.0 -4.0 -2.0 -3.0 .0 -2.0 -3.0 -3.0 .0 .0 -1.0 -3.0 .0 .0
.0 .0 1.0 1.0 1.0 -1.0 -1.0 .0 -1.0 -1.0 -1.0 1.0 -1.0 -1.0 -1.0 .0 -1.0 .0 -1.0 -1.0 -1.0 -3.0 -2.0 .0 -1.0 -2.0 -2.0 -2.0 -3.0 -3.0 -2.0 -2.0 -1.0 -1.0 .0 .0
1.0 .0 1.0 -1.0 1.0 -1.0 -1.0 .0 1.0 1.0 -1.0 -1.0 1.0 -3.0 -3.0 -1.0 -2.0 -2.0 -2.0 -3.0 -4.0 -3.0 -3.0 -2.0 -1.0 -3.0 -3.0 -2.0 -3.0 -2.0 -2.0 -2.0 -2.0 -2.0 -3.0 .0
-4.0 -4.0 -4.0 -5.0 -4.0 -4.0 -4.0 -4.0 -5.0 -2.0 -3.0 -2.0 -3.0 -4.0

Figure 24. SATOB 101 - 400 hPa RMS O-B vector differences (ms-1). JUNE 2002
All observations
Values are plotted where greater than 10 obs are present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60°N 30°N 0° 30°S 60°S
5 6 5 6 6 4 5
6 5 6 6 5 6 6 6 7 7 7 7 7 8 7 8 8 7 7 7 8 7 8 7 6 7 7 7 6 7 10 10
8 8 7 6 6 6 6 6 6 7 6 6 6 6 6 6 7 6 6 6 7 8 7 6 7 7 6 6 7 7 8 7 9 9 10 8
7 7 5 5 4 5 5 6 6 5 6 5 5 5 5 5 5 5 6 6 6 7 10 10 10 8 6 6 7 7 8 9 8 7 6 7
6 5 5 5 5 5 5 5 5 5 5 6 6 5 5 6 5 6 5 8 7 7 5 5 6 5 5 5 5 6 7 7 6 6 7 6
8 8 5 5 6 6 5 5 5 5 5 5 5 6 7 6 5 6 5 6 7 6 6 7 8 8 8 5 6 6 5 7 7 7 7 7
6 7 6 6 6 6 6 6 5 5 5 5 5 5 5 5 6 6 6 6 6 8 8 9 10 9 8 7 6 6 6 6 5 6 6 6
6 6 5 5 5 6 7 7 7 5 6 6 5 6 6 7 8 8 8 6 7 7 6 6 6 6 6 6 6 6 6 6 6 6 6 6
7 7 5 6 5 5 6 6 7 7 6 5 5 6 6 7 8 10 8 8 8 8 6 8 8 7 7 6 9 8 8 8 8 7 6 6
7 6 7 7 6 5 6 6 5 7 7 6 8 8 6 6 6 6 8 8 11 8 8 12 10 10 7 8 10 10 8 7 8 11 8 8
8 8 8 8 8 7 6 6 6 6 6 7 9 12 9 9 7 8 8 8 8 9 8 7 7 8 8 10 11 10 9 8 8 7 7 8
9 8 7 10 7 7 6 6 7 6 6 7 6 11 10 10 9 9 9 9 11 9 9 8 8 9 8 8 9 9 8 7 9 9 9 11
8 9 9 11 9 10 10 10 10 9 9 9 9 9

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15 and NOAA-16.

Standard of comparison :Background field from UKMO global model.

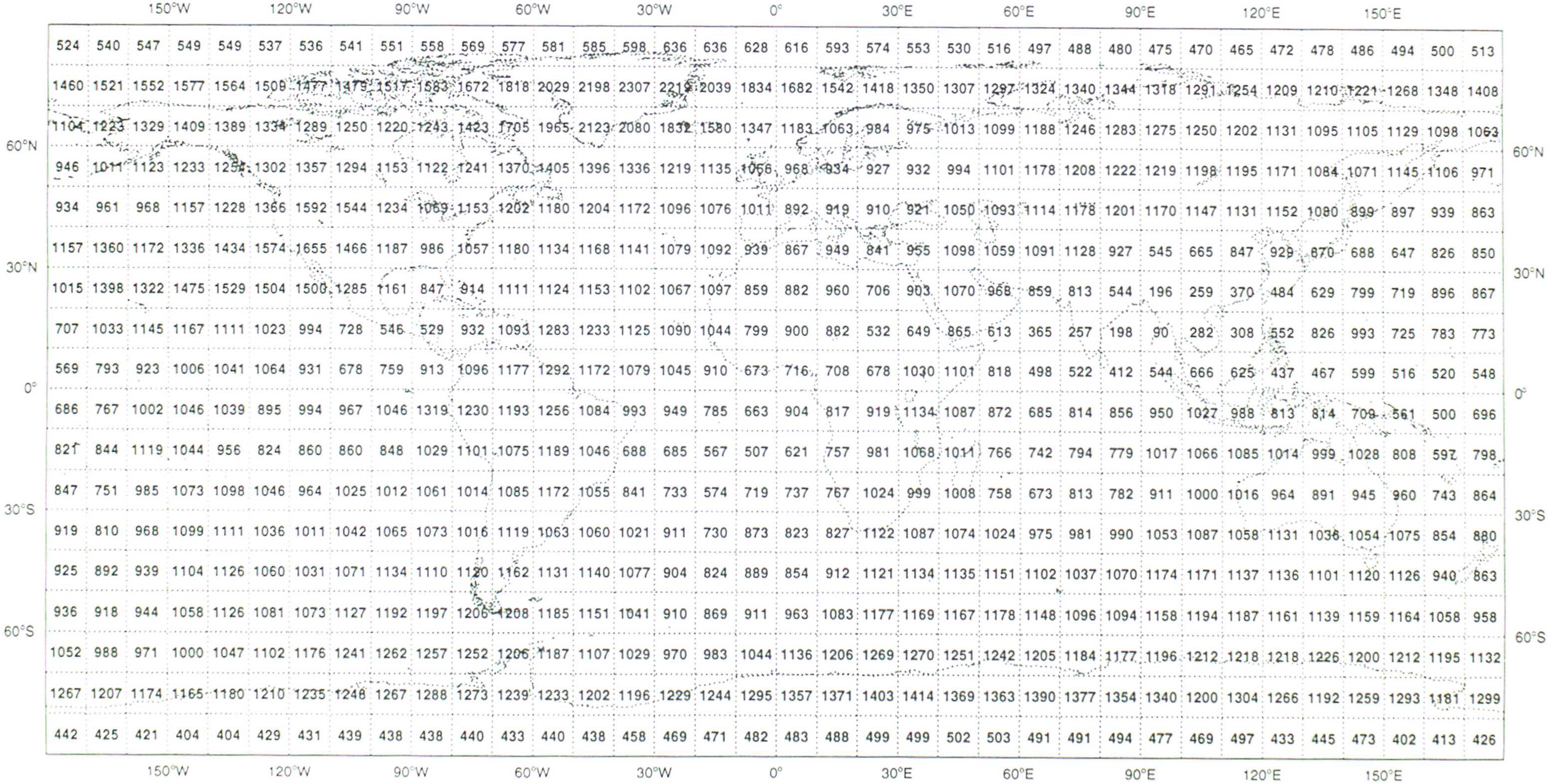
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

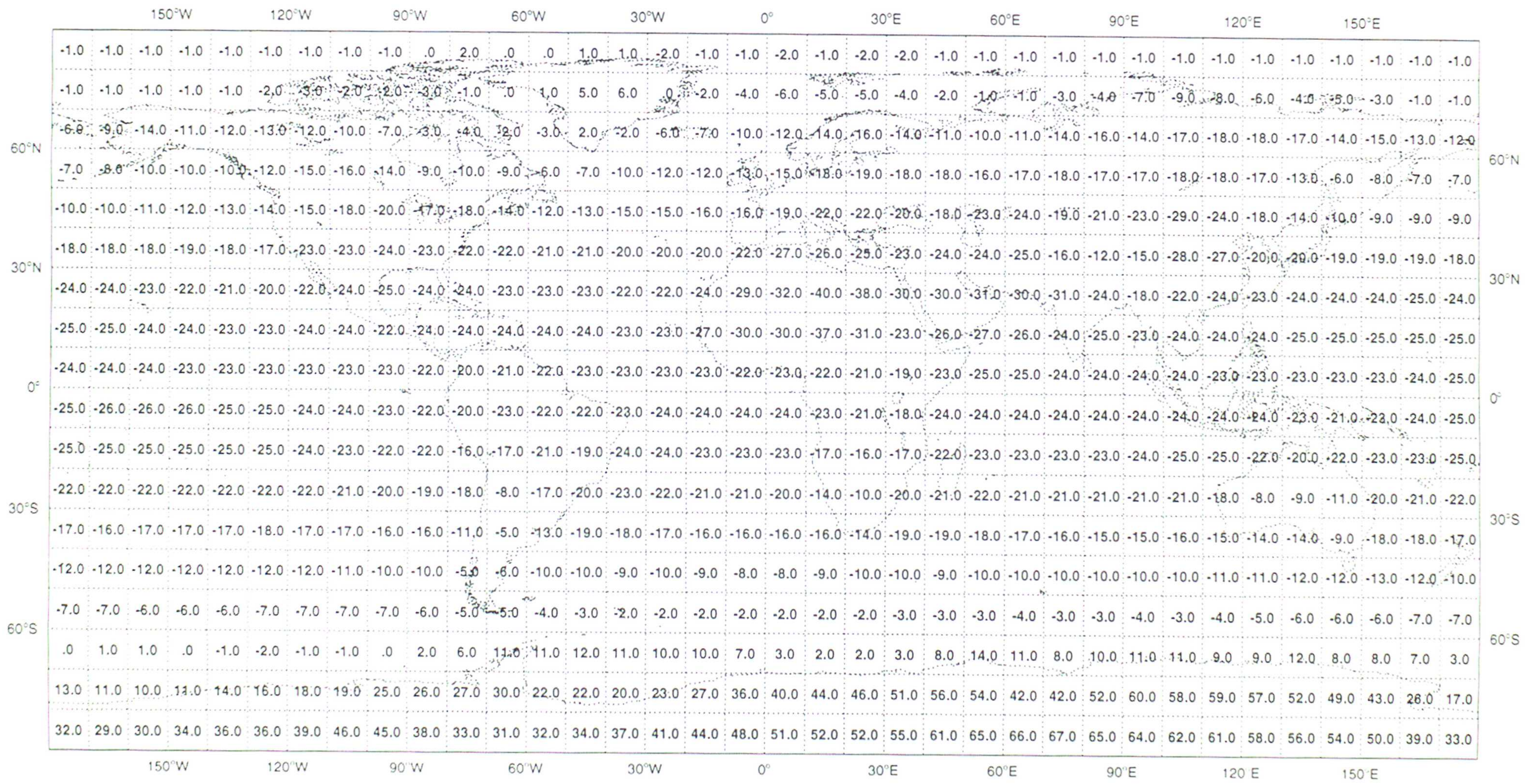
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. JUNE 2002
NOAA15, using all observations
Global average number of observations in 24 hours = 647657



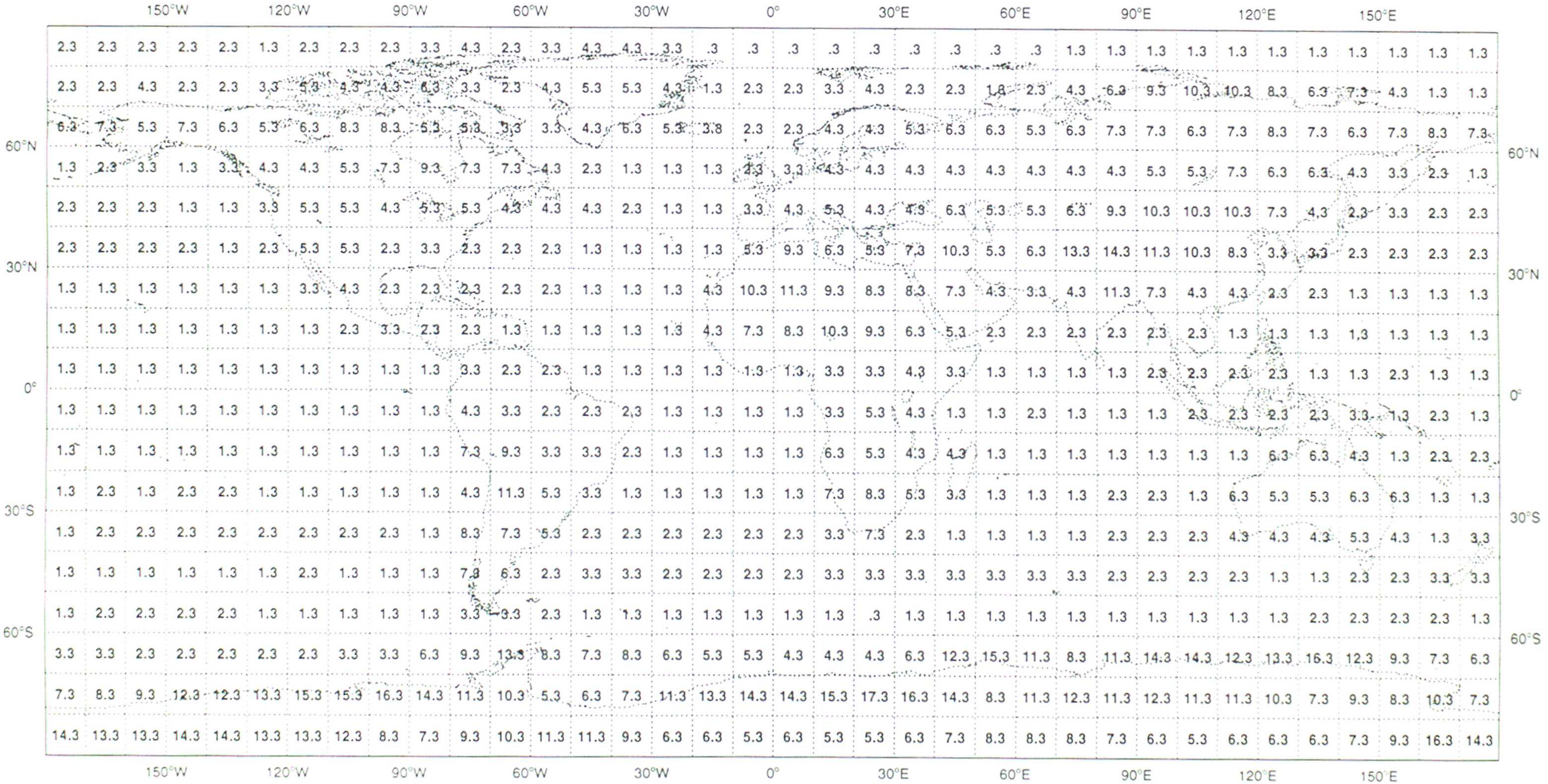
524	540	547	549	549	537	536	541	551	558	569	577	581	585	598	636	636	628	616	593	574	553	530	516	497	488	480	475	470	465	472	478	486	494	500	513
1460	1521	1552	1577	1564	1509	1477	1479	1517	1583	1672	1818	2029	2198	2307	2219	2039	1834	1682	1542	1418	1350	1307	1297	1324	1340	1344	1318	1291	1254	1209	1210	1221	1268	1348	1408
1104	1223	1329	1409	1389	1334	1289	1250	1220	1243	1423	1705	1965	2123	2080	1832	1580	1347	1183	1063	984	975	1013	1099	1188	1246	1283	1275	1250	1202	1131	1095	1105	1129	1098	1063
946	1011	1123	1233	1254	1302	1357	1294	1153	1122	1241	1370	1405	1396	1336	1219	1135	1056	968	934	927	932	994	1101	1178	1208	1222	1219	1198	1195	1171	1084	1071	1145	1106	971
934	961	968	1157	1228	1366	1592	1544	1234	1069	1153	1202	1180	1204	1172	1096	1076	1011	892	919	910	921	1050	1093	1114	1178	1201	1170	1147	1131	1152	1080	899	897	939	863
1157	1360	1172	1336	1434	1574	1655	1466	1187	986	1057	1180	1134	1168	1141	1079	1092	939	867	949	841	955	1098	1059	1091	1128	927	545	665	847	929	870	688	647	826	850
1015	1398	1322	1475	1529	1504	1500	1285	1161	847	914	1111	1124	1153	1102	1067	1097	859	882	960	706	903	1070	968	859	813	544	196	259	370	484	629	799	719	896	867
707	1033	1145	1167	1111	1023	994	728	546	529	932	1093	1283	1233	1125	1090	1044	799	900	882	532	649	865	613	365	257	198	90	282	308	552	826	993	725	783	773
569	793	923	1006	1041	1064	931	678	759	913	1096	1177	1292	1172	1079	1045	910	673	716	708	678	1030	1101	818	498	522	412	544	666	625	437	467	599	516	520	548
686	767	1002	1046	1039	895	994	967	1046	1319	1230	1193	1256	1084	993	949	785	663	904	817	919	1134	1087	872	685	814	856	950	1027	988	813	814	709	561	500	696
821	844	1119	1044	956	824	860	860	848	1029	1101	1075	1189	1046	688	685	567	507	621	757	981	1068	1011	766	742	794	779	1017	1066	1085	1014	999	1028	808	597	798
847	751	985	1073	1098	1046	964	1025	1012	1061	1014	1085	1172	1055	841	733	574	719	737	767	1024	999	1008	758	673	813	782	911	1000	1016	964	891	945	960	743	864
919	810	968	1099	1111	1036	1011	1042	1065	1073	1016	1119	1063	1060	1021	911	730	873	823	827	1122	1087	1074	1024	975	981	990	1053	1087	1058	1131	1036	1054	1075	854	880
925	892	939	1104	1126	1060	1031	1071	1134	1110	1120	1162	1131	1140	1077	904	824	889	854	912	1121	1134	1135	1151	1102	1037	1070	1174	1171	1137	1136	1101	1120	1126	940	863
936	918	944	1058	1126	1081	1073	1127	1192	1197	1206	1208	1185	1151	1041	910	869	911	963	1083	1177	1169	1167	1178	1148	1096	1094	1158	1194	1187	1161	1139	1159	1164	1058	958
1052	988	971	1000	1047	1102	1176	1241	1262	1257	1252	1206	1187	1107	1029	970	983	1044	1136	1206	1269	1270	1251	1242	1205	1184	1177	1196	1212	1218	1218	1226	1200	1212	1195	1132
1267	1207	1174	1165	1180	1210	1235	1248	1267	1288	1273	1239	1233	1202	1196	1229	1244	1295	1357	1371	1403	1414	1369	1363	1390	1377	1354	1340	1200	1304	1266	1192	1259	1293	1181	1299
442	425	421	404	404	429	431	439	438	438	440	433	440	438	458	469	471	482	483	488	499	499	502	503	491	491	494	477	469	497	433	445	473	402	413	426

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



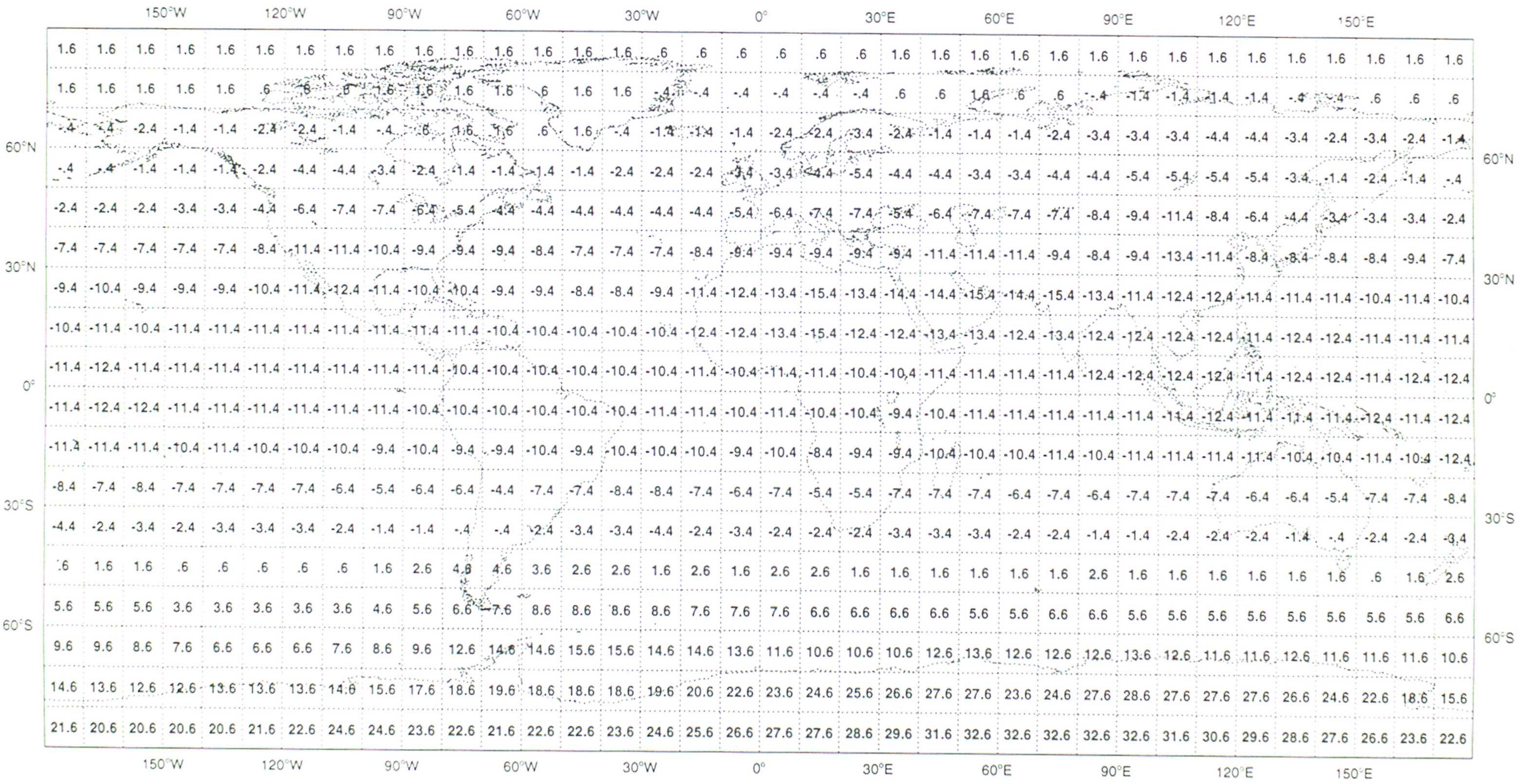
-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	.0	2.0	.0	.0	1.0	1.0	-2.0	-1.0	-1.0	-2.0	-1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-3.0	-2.0	-2.0	-3.0	-1.0	.0	1.0	5.0	6.0	.0	-2.0	-4.0	-6.0	-5.0	-5.0	-4.0	-2.0	-1.0	-1.0	-3.0	-4.0	-7.0	-9.0	-8.0	-6.0	-4.0	-5.0	-3.0	-1.0	-1.0
-6.0	-9.0	-14.0	-11.0	-12.0	-13.0	-12.0	-10.0	-7.0	-3.0	-4.0	-2.0	-3.0	2.0	-2.0	-6.0	-7.0	-10.0	-12.0	-14.0	-16.0	-14.0	-11.0	-10.0	-11.0	-14.0	-16.0	-14.0	-17.0	-18.0	-18.0	-17.0	-14.0	-15.0	-13.0	-12.0
-7.0	-8.0	-10.0	-10.0	-10.0	-12.0	-15.0	-16.0	-14.0	-9.0	-10.0	-9.0	-6.0	-7.0	-10.0	-12.0	-12.0	-13.0	-15.0	-18.0	-19.0	-18.0	-18.0	-16.0	-17.0	-18.0	-17.0	-17.0	-18.0	-18.0	-17.0	-13.0	-6.0	-8.0	-7.0	-7.0
-10.0	-10.0	-11.0	-12.0	-13.0	-14.0	-15.0	-18.0	-20.0	-17.0	-18.0	-14.0	-12.0	-13.0	-15.0	-15.0	-16.0	-16.0	-19.0	-22.0	-22.0	-20.0	-18.0	-23.0	-24.0	-19.0	-21.0	-23.0	-29.0	-24.0	-18.0	-14.0	-10.0	-9.0	-9.0	-9.0
-18.0	-18.0	-18.0	-19.0	-18.0	-17.0	-23.0	-23.0	-24.0	-23.0	-22.0	-22.0	-21.0	-21.0	-20.0	-20.0	-20.0	-22.0	-27.0	-26.0	-25.0	-23.0	-24.0	-24.0	-25.0	-16.0	-12.0	-15.0	-28.0	-27.0	-20.0	-20.0	-19.0	-19.0	-19.0	-18.0
-24.0	-24.0	-23.0	-22.0	-21.0	-20.0	-22.0	-24.0	-25.0	-24.0	-24.0	-23.0	-23.0	-23.0	-22.0	-22.0	-24.0	-29.0	-32.0	-40.0	-38.0	-30.0	-30.0	-31.0	-30.0	-31.0	-24.0	-18.0	-22.0	-24.0	-23.0	-24.0	-24.0	-24.0	-25.0	-24.0
-25.0	-25.0	-24.0	-24.0	-23.0	-23.0	-24.0	-24.0	-22.0	-24.0	-24.0	-24.0	-24.0	-24.0	-23.0	-23.0	-27.0	-30.0	-30.0	-37.0	-31.0	-23.0	-26.0	-27.0	-26.0	-24.0	-25.0	-23.0	-24.0	-24.0	-24.0	-25.0	-25.0	-25.0	-25.0	-25.0
-24.0	-24.0	-24.0	-23.0	-23.0	-23.0	-23.0	-23.0	-23.0	-22.0	-20.0	-21.0	-22.0	-23.0	-23.0	-23.0	-23.0	-22.0	-23.0	-22.0	-21.0	-19.0	-23.0	-25.0	-25.0	-24.0	-24.0	-24.0	-24.0	-23.0	-23.0	-23.0	-23.0	-23.0	-24.0	-25.0
-25.0	-26.0	-26.0	-26.0	-25.0	-25.0	-24.0	-24.0	-23.0	-22.0	-20.0	-23.0	-22.0	-22.0	-23.0	-24.0	-24.0	-24.0	-24.0	-23.0	-21.0	-18.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-24.0	-23.0	-21.0	-23.0	-24.0	-25.0
-25.0	-25.0	-25.0	-25.0	-25.0	-25.0	-24.0	-23.0	-22.0	-22.0	-16.0	-17.0	-21.0	-19.0	-24.0	-24.0	-23.0	-23.0	-23.0	-17.0	-16.0	-17.0	-22.0	-23.0	-23.0	-23.0	-23.0	-24.0	-25.0	-25.0	-22.0	-20.0	-22.0	-23.0	-23.0	-25.0
-22.0	-22.0	-22.0	-22.0	-22.0	-22.0	-22.0	-21.0	-20.0	-19.0	-18.0	-8.0	-17.0	-20.0	-23.0	-22.0	-21.0	-21.0	-20.0	-14.0	-10.0	-20.0	-21.0	-22.0	-21.0	-21.0	-21.0	-21.0	-21.0	-18.0	-8.0	-9.0	-11.0	-20.0	-21.0	-22.0
-17.0	-16.0	-17.0	-17.0	-17.0	-18.0	-17.0	-17.0	-16.0	-16.0	-11.0	-5.0	-13.0	-19.0	-18.0	-17.0	-16.0	-16.0	-16.0	-16.0	-14.0	-19.0	-19.0	-18.0	-17.0	-16.0	-15.0	-15.0	-16.0	-15.0	-14.0	-14.0	-9.0	-18.0	-18.0	-17.0
-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-12.0	-11.0	-10.0	-10.0	-5.0	-6.0	-10.0	-10.0	-9.0	-10.0	-9.0	-8.0	-8.0	-9.0	-10.0	-10.0	-9.0	-10.0	-10.0	-10.0	-10.0	-10.0	-10.0	-11.0	-11.0	-12.0	-12.0	-13.0	-12.0	-10.0
-7.0	-7.0	-6.0	-6.0	-6.0	-7.0	-7.0	-7.0	-7.0	-6.0	-5.0	-5.0	-4.0	-3.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-3.0	-3.0	-3.0	-4.0	-3.0	-3.0	-4.0	-3.0	-4.0	-5.0	-6.0	-6.0	-6.0	-7.0	-7.0
.0	1.0	1.0	.0	-1.0	-2.0	-1.0	-1.0	.0	2.0	6.0	11.0	11.0	12.0	11.0	10.0	10.0	7.0	3.0	2.0	2.0	3.0	8.0	14.0	11.0	8.0	10.0	11.0	11.0	9.0	9.0	12.0	8.0	8.0	7.0	3.0
13.0	11.0	10.0	11.0	14.0	16.0	18.0	19.0	25.0	26.0	27.0	30.0	22.0	22.0	20.0	23.0	27.0	36.0	40.0	44.0	46.0	51.0	56.0	54.0	42.0	42.0	52.0	60.0	58.0	59.0	57.0	52.0	49.0	43.0	26.0	17.0
32.0	29.0	30.0	34.0	36.0	36.0	39.0	46.0	45.0	38.0	33.0	31.0	32.0	34.0	37.0	41.0	44.0	48.0	51.0	52.0	52.0	55.0	61.0	65.0	66.0	67.0	65.0	64.0	62.0	61.0	58.0	56.0	54.0	50.0	39.0	33.0

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS8 (Surface)
NOAA15, using all observations



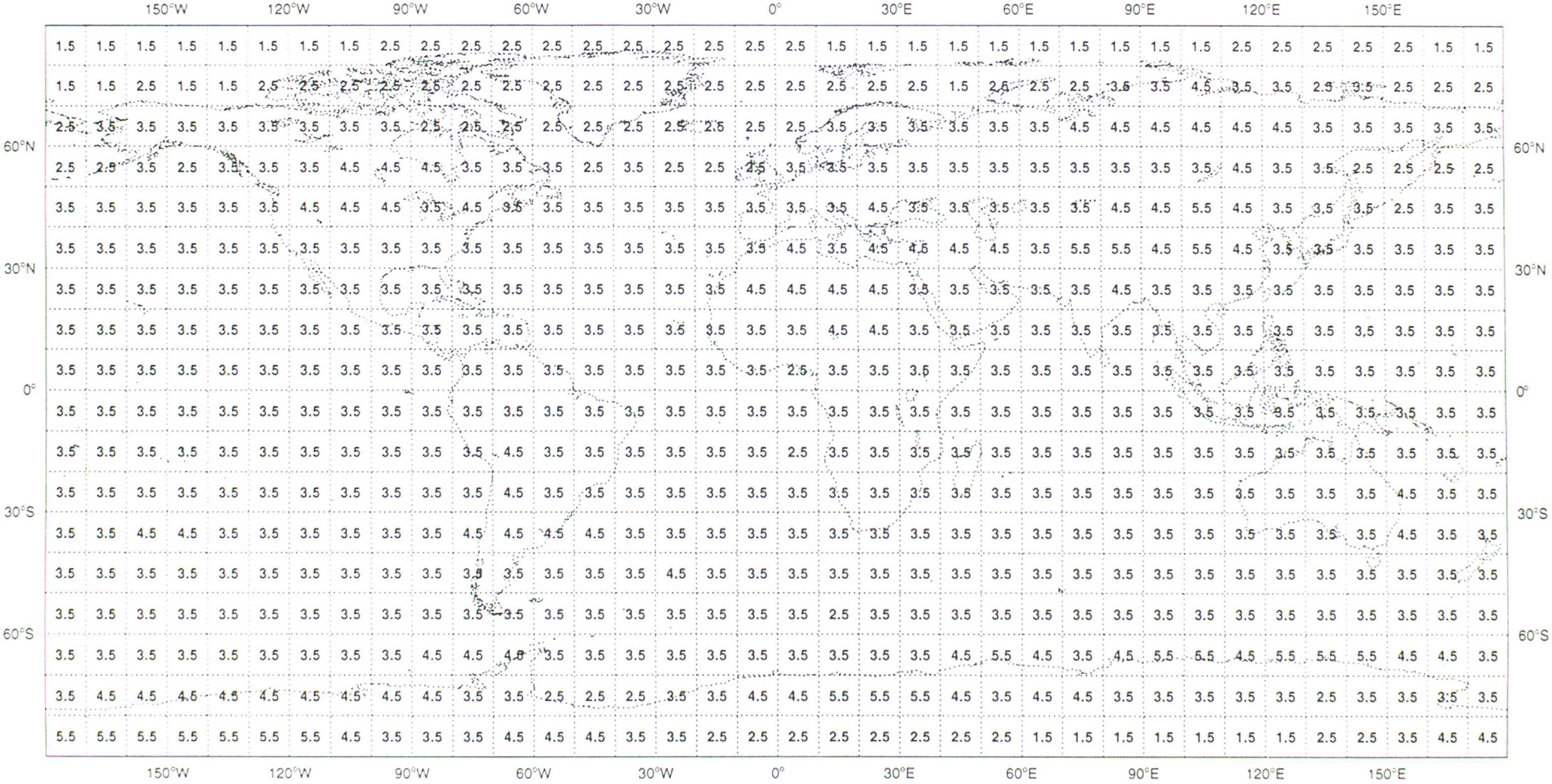
2.3	2.3	2.3	2.3	2.3	1.3	2.3	2.3	2.3	3.3	4.3	2.3	3.3	4.3	4.3	3.3	.3	.3	.3	.3	.3	.3	.3	.3	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
2.3	2.3	4.3	2.3	2.3	3.3	5.3	4.3	4.3	6.3	3.3	2.3	4.3	5.3	5.3	4.3	1.3	2.3	2.3	3.3	4.3	2.3	2.3	1.8	2.3	4.3	6.3	9.3	10.3	10.3	8.3	6.3	7.3	4.3	1.3	1.3
6.3	7.3	5.3	7.3	6.3	5.3	6.3	8.3	8.3	5.3	5.3	3.3	3.3	4.3	6.3	5.3	3.8	2.3	2.3	4.3	4.3	5.3	6.3	6.3	5.3	6.3	7.3	7.3	6.3	7.3	8.3	7.3	6.3	7.3	8.3	7.3
1.3	2.3	3.3	1.3	3.3	4.3	4.3	5.3	7.3	9.3	7.3	7.3	4.3	2.3	1.3	1.3	1.3	2.3	3.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	5.3	5.3	7.3	6.3	6.3	4.3	3.3	2.3	1.3
2.3	2.3	2.3	1.3	1.3	3.3	5.3	5.3	4.3	5.3	5.3	4.3	4.3	4.3	2.3	1.3	1.3	3.3	4.3	5.3	4.3	4.3	6.3	5.3	5.3	6.3	9.3	10.3	10.3	10.3	7.3	4.3	2.3	3.3	2.3	2.3
2.3	2.3	2.3	2.3	1.3	2.3	5.3	5.3	2.3	3.3	2.3	2.3	2.3	1.3	1.3	1.3	1.3	5.3	9.3	6.3	5.3	7.3	10.3	5.3	6.3	13.3	14.3	11.3	10.3	8.3	3.3	3.3	2.3	2.3	2.3	2.3
1.3	1.3	1.3	1.3	1.3	1.3	3.3	4.3	2.3	2.3	2.3	2.3	2.3	1.3	1.3	1.3	4.3	10.3	11.3	9.3	8.3	8.3	7.3	4.3	3.3	4.3	11.3	7.3	4.3	4.3	2.3	2.3	1.3	1.3	1.3	1.3
1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.3	3.3	2.3	2.3	1.3	1.3	1.3	1.3	1.3	4.3	7.3	8.3	10.3	9.3	6.3	5.3	2.3	2.3	2.3	2.3	2.3	2.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	3.3	2.3	2.3	1.3	1.3	1.3	1.3	1.3	1.3	3.3	3.3	4.3	3.3	1.3	1.3	1.3	1.3	2.3	2.3	2.3	2.3	1.3	1.3	2.3	1.3	1.3
1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	4.3	3.3	2.3	2.3	2.3	1.3	1.3	1.3	1.3	3.3	5.3	4.3	1.3	1.3	2.3	1.3	1.3	1.3	2.3	2.3	2.3	2.3	3.3	1.3	2.3	1.3
1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	7.3	9.3	3.3	3.3	2.3	1.3	1.3	1.3	1.3	6.3	5.3	4.3	4.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	6.3	6.3	4.3	1.3	2.3	2.3
1.3	2.3	1.3	2.3	2.3	1.3	1.3	1.3	1.3	1.3	4.3	11.3	5.3	3.3	1.3	1.3	1.3	1.3	1.3	7.3	8.3	5.3	3.3	1.3	1.3	1.3	2.3	2.3	1.3	6.3	5.3	5.3	6.3	6.3	1.3	1.3
1.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3	1.3	8.3	7.3	5.3	2.3	2.3	2.3	2.3	2.3	2.3	3.3	7.3	2.3	1.3	1.3	1.3	1.3	2.3	2.3	2.3	4.3	4.3	4.3	5.3	4.3	1.3	3.3
1.3	1.3	1.3	1.3	1.3	1.3	2.3	1.3	1.3	1.3	7.3	6.3	2.3	3.3	3.3	2.3	2.3	2.3	2.3	3.3	3.3	3.3	3.3	3.3	3.3	3.3	2.3	2.3	2.3	2.3	1.3	1.3	2.3	2.3	3.3	3.3
1.3	2.3	2.3	2.3	2.3	1.3	1.3	1.3	1.3	1.3	3.3	3.3	2.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	2.3	2.3	2.3	2.3	1.3
3.3	3.3	2.3	2.3	2.3	2.3	2.3	3.3	3.3	6.3	9.3	13.3	8.3	7.3	8.3	6.3	5.3	5.3	4.3	4.3	4.3	6.3	12.3	15.3	11.3	8.3	11.3	14.3	14.3	12.3	13.3	16.3	12.3	9.3	7.3	6.3
7.3	8.3	9.3	12.3	12.3	13.3	15.3	15.3	16.3	14.3	11.3	10.3	5.3	6.3	7.3	11.3	13.3	14.3	14.3	15.3	17.3	16.3	14.3	8.3	11.3	12.3	11.3	12.3	11.3	11.3	10.3	7.3	9.3	8.3	10.3	7.3
14.3	13.3	13.3	14.3	14.3	13.3	13.3	12.3	8.3	7.3	9.3	10.3	11.3	11.3	9.3	6.3	6.3	5.3	6.3	5.3	5.3	6.3	7.3	8.3	8.3	8.3	7.3	6.3	5.3	6.3	6.3	6.3	7.3	9.3	16.3	14.3

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



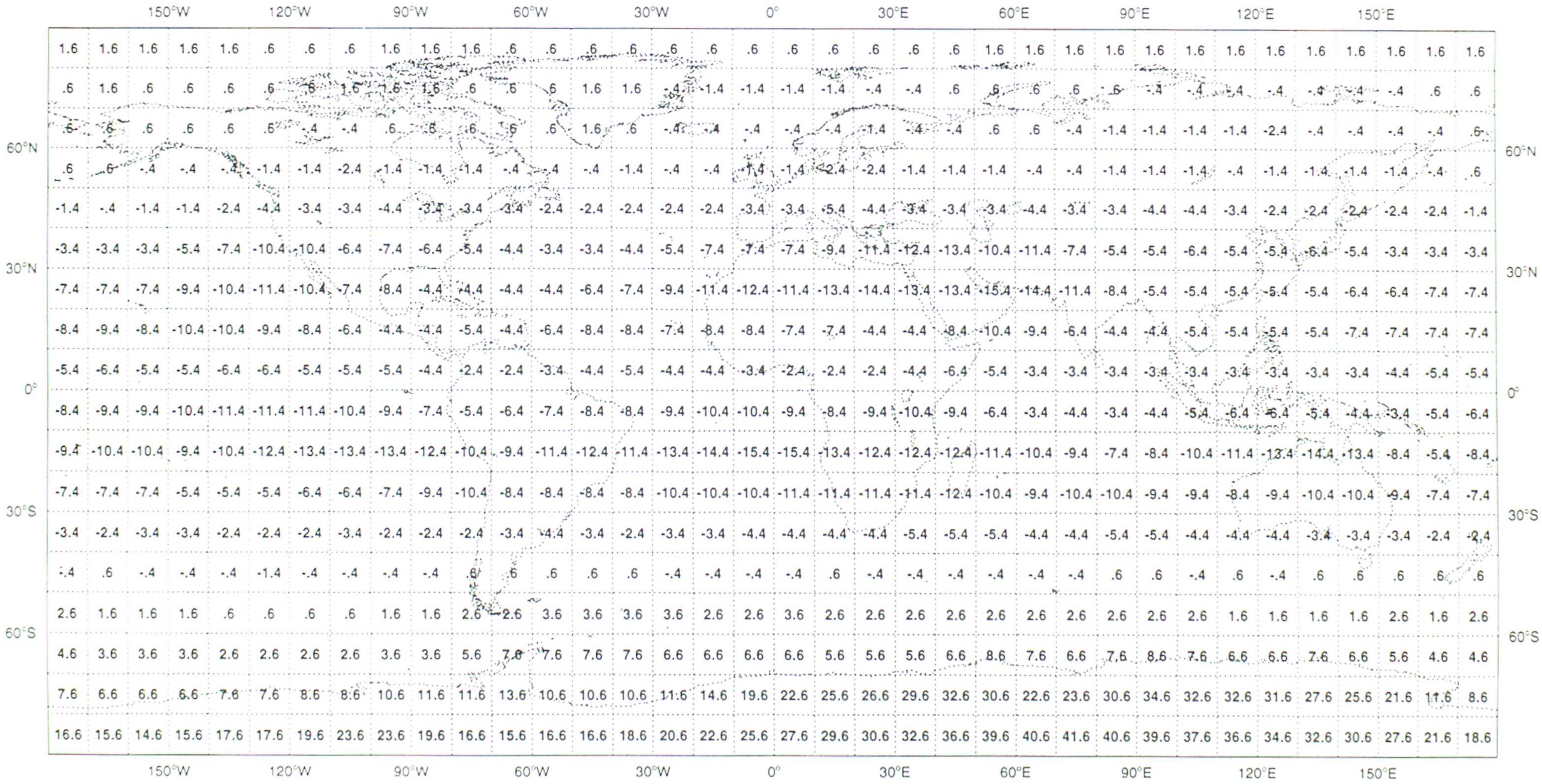
1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	.6	.6	.6	.6	.6	.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
1.6	1.6	1.6	1.6	1.6	.6	.6	.6	1.6	1.6	1.6	1.6	.6	1.6	1.6	-.4	-.4	-.4	-.4	-.4	-.4	.6	.6	1.6	.6	.6	-.4	-1.4	-1.4	-1.4	-1.4	-.4	-.4	.6	.6	.6
-.4	-.4	-2.4	-1.4	-1.4	-2.4	-2.4	-1.4	-.4	.6	1.6	1.6	.6	1.6	-.4	-1.4	-1.4	-1.4	-2.4	-2.4	-3.4	-2.4	-1.4	-1.4	-1.4	-2.4	-3.4	-3.4	-3.4	-4.4	-4.4	-3.4	-2.4	-3.4	-2.4	-1.4
-.4	-.4	-1.4	-1.4	-1.4	-2.4	-4.4	-4.4	-3.4	-2.4	-1.4	-1.4	-1.4	-1.4	-2.4	-2.4	-2.4	-3.4	-3.4	-4.4	-5.4	-4.4	-4.4	-3.4	-3.4	-4.4	-4.4	-5.4	-5.4	-5.4	-5.4	-3.4	-1.4	-2.4	-1.4	-.4
-2.4	-2.4	-2.4	-3.4	-3.4	-4.4	-6.4	-7.4	-7.4	-6.4	-5.4	-4.4	-4.4	-4.4	-4.4	-4.4	-4.4	-5.4	-6.4	-7.4	-7.4	-5.4	-6.4	-7.4	-7.4	-7.4	-8.4	-9.4	-11.4	-8.4	-6.4	-4.4	-3.4	-3.4	-3.4	-2.4
-7.4	-7.4	-7.4	-7.4	-7.4	-8.4	-11.4	-11.4	-10.4	-9.4	-9.4	-9.4	-8.4	-7.4	-7.4	-7.4	-8.4	-9.4	-9.4	-9.4	-9.4	-9.4	-11.4	-11.4	-11.4	-9.4	-8.4	-9.4	-13.4	-11.4	-8.4	-8.4	-8.4	-8.4	-9.4	-7.4
-9.4	-10.4	-9.4	-9.4	-9.4	-10.4	-11.4	-12.4	-11.4	-10.4	-10.4	-9.4	-9.4	-8.4	-8.4	-9.4	-11.4	-12.4	-13.4	-15.4	-13.4	-14.4	-14.4	-15.4	-14.4	-15.4	-13.4	-11.4	-12.4	-12.4	-11.4	-11.4	-11.4	-10.4	-11.4	-10.4
-10.4	-11.4	-10.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-10.4	-10.4	-10.4	-10.4	-10.4	-12.4	-12.4	-13.4	-15.4	-12.4	-12.4	-13.4	-13.4	-12.4	-13.4	-12.4	-12.4	-12.4	-12.4	-11.4	-12.4	-12.4	-11.4	-11.4	-11.4
-11.4	-12.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-11.4	-10.4	-11.4	-11.4	-10.4	-10.4	-11.4	-11.4	-11.4	-11.4	-12.4	-12.4	-12.4	-12.4	-11.4	-12.4	-12.4	-11.4	-12.4	-12.4
-11.4	-12.4	-12.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-10.4	-10.4	-10.4	-10.4	-10.4	-10.4	-11.4	-11.4	-10.4	-11.4	-10.4	-10.4	-9.4	-10.4	-11.4	-11.4	-11.4	-11.4	-11.4	-11.4	-12.4	-11.4	-11.4	-11.4	-12.4	-11.4	-12.4
-11.4	-11.4	-11.4	-10.4	-11.4	-10.4	-10.4	-10.4	-9.4	-10.4	-9.4	-9.4	-10.4	-9.4	-10.4	-10.4	-10.4	-9.4	-10.4	-8.4	-9.4	-9.4	-10.4	-10.4	-10.4	-11.4	-10.4	-11.4	-11.4	-11.4	-11.4	-10.4	-10.4	-11.4	-10.4	-12.4
-8.4	-7.4	-8.4	-7.4	-7.4	-7.4	-7.4	-6.4	-5.4	-6.4	-6.4	-4.4	-7.4	-7.4	-8.4	-8.4	-7.4	-6.4	-7.4	-5.4	-5.4	-7.4	-7.4	-7.4	-6.4	-7.4	-6.4	-7.4	-7.4	-7.4	-6.4	-6.4	-5.4	-7.4	-7.4	-8.4
-4.4	-2.4	-3.4	-2.4	-3.4	-3.4	-3.4	-2.4	-1.4	-1.4	-.4	-.4	-2.4	-3.4	-3.4	-4.4	-2.4	-3.4	-2.4	-2.4	-2.4	-3.4	-3.4	-3.4	-2.4	-2.4	-1.4	-1.4	-2.4	-2.4	-2.4	-1.4	-.4	-2.4	-2.4	-3.4
.6	1.6	1.6	.6	.6	.6	.6	.6	1.6	2.6	4.6	4.6	3.6	2.6	2.6	1.6	2.6	1.6	2.6	2.6	1.6	1.6	1.6	1.6	1.6	1.6	2.6	1.6	1.6	1.6	1.6	1.6	1.6	.6	1.6	2.6
5.6	5.6	5.6	3.6	3.6	3.6	3.6	3.6	4.6	5.6	6.6	7.6	8.6	8.6	8.6	8.6	7.6	7.6	7.6	6.6	6.6	6.6	6.6	5.6	5.6	6.6	6.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	5.6	6.6
9.6	9.6	8.6	7.6	6.6	6.6	6.6	7.6	8.6	9.6	12.6	14.6	14.6	15.6	15.6	14.6	14.6	13.6	11.6	10.6	10.6	10.6	12.6	13.6	12.6	12.6	12.6	13.6	12.6	11.6	11.6	12.6	11.6	11.6	11.6	10.6
14.6	13.6	12.6	12.6	13.6	13.6	13.6	14.6	15.6	17.6	18.6	19.6	18.6	18.6	18.6	19.6	20.6	22.6	23.6	24.6	25.6	26.6	27.6	27.6	23.6	24.6	27.6	28.6	27.6	27.6	27.6	26.6	24.6	22.6	18.6	15.6
21.6	20.6	20.6	20.6	20.6	21.6	22.6	24.6	24.6	23.6	22.6	21.6	22.6	22.6	23.6	24.6	25.6	26.6	27.6	27.6	28.6	29.6	31.6	32.6	32.6	32.6	32.6	32.6	31.6	30.6	29.6	28.6	27.6	26.6	23.6	22.6

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5
1.5	1.5	2.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	2.5	2.5	2.5	3.5	3.5	4.5	3.5	3.5	2.5	3.5	2.5	2.5	2.5
2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5
2.5	2.5	3.5	2.5	3.5	3.5	3.5	4.5	4.5	4.5	3.5	3.5	3.5	2.5	3.5	2.5	2.5	2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	2.5	2.5	2.5	2.5
3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	5.5	4.5	3.5	3.5	3.5	2.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	4.5	4.5	4.5	4.5	3.5	5.5	5.5	4.5	5.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5
3.5	3.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	4.5	5.5	4.5	3.5	4.5	5.5	5.5	4.5	5.5	5.5	5.5	4.5	4.5	3.5
3.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	3.5	3.5	2.5	2.5	2.5	3.5	3.5	4.5	4.5	5.5	5.5	5.5	4.5	3.5	4.5	4.5	3.5	3.5	3.5	3.5	3.5	2.5	3.5	3.5	3.5	3.5
5.5	5.5	5.5	5.5	5.5	5.5	5.5	4.5	3.5	3.5	3.5	4.5	4.5	4.5	3.5	3.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5	3.5	4.5	4.5

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



1.6	1.6	1.6	1.6	1.6	.6	.6	.6	1.6	1.6	1.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
.6	1.6	.6	.6	.6	.6	.6	1.6	1.6	1.6	.6	.6	.6	1.6	1.6	-.4	-1.4	-1.4	-1.4	-1.4	-.4	-.4	.6	.6	.6	.6	.6	-.4	-.4	-.4	-.4	-.4	-.4	-.4	.6	.6
.6	.6	.6	.6	.6	.6	-.4	-.4	.6	.6	.6	.6	.6	1.6	.6	-.4	-.4	-.4	-.4	-.4	-1.4	-.4	-.4	.6	.6	-.4	-1.4	-1.4	-1.4	-1.4	-2.4	-.4	-.4	-.4	-.4	.6
.6	.6	-.4	-.4	-.4	-1.4	-1.4	-2.4	-1.4	-1.4	-1.4	-.4	-.4	-.4	-1.4	-.4	-.4	-1.4	-1.4	-2.4	-2.4	-1.4	-1.4	-1.4	-.4	-.4	-1.4	-1.4	-1.4	-.4	-1.4	-1.4	-1.4	-1.4	-.4	.6
-1.4	-.4	-1.4	-1.4	-2.4	-4.4	-3.4	-3.4	-4.4	-3.4	-3.4	-3.4	-2.4	-2.4	-2.4	-2.4	-2.4	-3.4	-3.4	-5.4	-4.4	-3.4	-3.4	-3.4	-4.4	-3.4	-3.4	-4.4	-4.4	-3.4	-2.4	-2.4	-2.4	-2.4	-2.4	-1.4
-3.4	-3.4	-3.4	-5.4	-7.4	-10.4	-10.4	-6.4	-7.4	-6.4	-5.4	-4.4	-3.4	-3.4	-4.4	-5.4	-7.4	-7.4	-7.4	-9.4	-11.4	-12.4	-13.4	-10.4	-11.4	-7.4	-5.4	-5.4	-6.4	-5.4	-5.4	-6.4	-5.4	-3.4	-3.4	-3.4
-7.4	-7.4	-7.4	-9.4	-10.4	-11.4	-10.4	-7.4	-8.4	-4.4	-4.4	-4.4	-4.4	-6.4	-7.4	-9.4	-11.4	-12.4	-11.4	-13.4	-14.4	-13.4	-13.4	-15.4	-14.4	-11.4	-8.4	-5.4	-5.4	-5.4	-5.4	-5.4	-6.4	-6.4	-7.4	-7.4
-8.4	-9.4	-8.4	-10.4	-10.4	-9.4	-8.4	-6.4	-4.4	-4.4	-5.4	-4.4	-6.4	-8.4	-8.4	-7.4	-8.4	-8.4	-7.4	-7.4	-4.4	-4.4	-8.4	-10.4	-9.4	-6.4	-4.4	-4.4	-5.4	-5.4	-5.4	-5.4	-7.4	-7.4	-7.4	-7.4
-5.4	-6.4	-5.4	-5.4	-6.4	-6.4	-5.4	-5.4	-5.4	-4.4	-2.4	-2.4	-3.4	-4.4	-5.4	-4.4	-4.4	-3.4	-2.4	-2.4	-2.4	-4.4	-6.4	-5.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-3.4	-4.4	-5.4	-5.4
-8.4	-9.4	-9.4	-10.4	-11.4	-11.4	-11.4	-10.4	-9.4	-7.4	-5.4	-6.4	-7.4	-8.4	-8.4	-9.4	-10.4	-10.4	-9.4	-8.4	-9.4	-10.4	-9.4	-6.4	-3.4	-4.4	-3.4	-4.4	-5.4	-6.4	-6.4	-5.4	-4.4	-3.4	-5.4	-6.4
-9.4	-10.4	-10.4	-9.4	-10.4	-12.4	-13.4	-13.4	-13.4	-12.4	-10.4	-9.4	-11.4	-12.4	-11.4	-13.4	-14.4	-15.4	-15.4	-13.4	-12.4	-12.4	-12.4	-11.4	-10.4	-9.4	-7.4	-8.4	-10.4	-11.4	-13.4	-14.4	-13.4	-8.4	-5.4	-8.4
-7.4	-7.4	-7.4	-5.4	-5.4	-5.4	-6.4	-6.4	-7.4	-9.4	-10.4	-8.4	-8.4	-8.4	-8.4	-10.4	-10.4	-10.4	-11.4	-11.4	-11.4	-11.4	-12.4	-10.4	-9.4	-10.4	-10.4	-9.4	-9.4	-8.4	-9.4	-10.4	-10.4	-9.4	-7.4	-7.4
-3.4	-2.4	-3.4	-3.4	-2.4	-2.4	-2.4	-3.4	-2.4	-2.4	-2.4	-3.4	-4.4	-3.4	-2.4	-3.4	-3.4	-4.4	-4.4	-4.4	-4.4	-5.4	-5.4	-5.4	-4.4	-4.4	-5.4	-5.4	-4.4	-4.4	-4.4	-3.4	-3.4	-3.4	-2.4	-2.4
-.4	.6	-.4	-.4	-.4	-1.4	-.4	-.4	-.4	-.4	.6	.6	.6	.6	.6	-.4	-.4	-.4	-.4	.6	-.4	-.4	-.4	-.4	-.4	-.4	.6	.6	-.4	.6	-.4	.6	.6	.6	.6	.6
2.6	1.6	1.6	1.6	.6	.6	.6	.6	1.6	1.6	2.6	2.6	3.6	3.6	3.6	3.6	2.6	2.6	3.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	1.6	1.6	1.6	1.6	2.6	1.6	2.6
4.6	3.6	3.6	3.6	2.6	2.6	2.6	2.6	3.6	3.6	5.6	7.6	7.6	7.6	7.6	6.6	6.6	6.6	6.6	5.6	5.6	5.6	6.6	8.6	7.6	6.6	7.6	8.6	7.6	6.6	6.6	7.6	6.6	5.6	4.6	4.6
7.6	6.6	6.6	6.6	7.6	7.6	8.6	8.6	10.6	11.6	11.6	13.6	10.6	10.6	10.6	11.6	14.6	19.6	22.6	25.6	26.6	29.6	32.6	30.6	22.6	23.6	30.6	34.6	32.6	32.6	31.6	27.6	25.6	21.6	11.6	8.6
16.6	15.6	14.6	15.6	17.6	17.6	19.6	23.6	23.6	19.6	16.6	15.6	16.6	16.6	18.6	20.6	22.6	25.6	27.6	29.6	30.6	32.6	36.6	39.6	40.6	41.6	40.6	39.6	37.6	36.6	34.6	32.6	30.6	27.6	21.6	18.6

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations

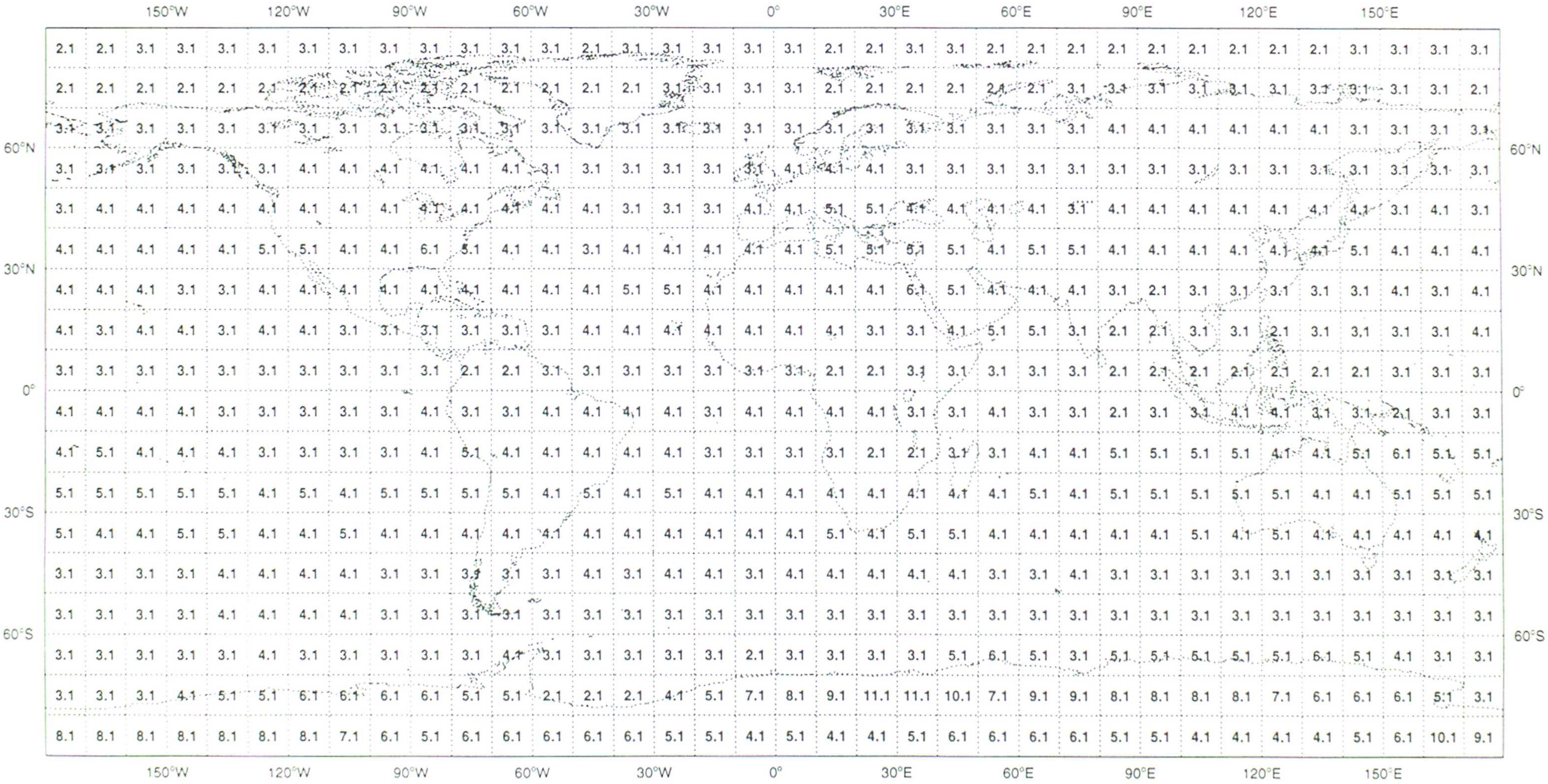

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
2.1 2.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 2.1 3.1 3.1 3.1 3.1 3.1 2.1 2.1 3.1 3.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 3.1 3.1 3.1 3.1
2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 3.1 3.1 3.1 3.1 2.1 2.1 2.1 2.1 2.1 2.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 2.1
3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 4.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1
3.1 3.1 3.1 3.1 3.1 3.1 4.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 3.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1
3.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 4.1 4.1 5.1 5.1 4.1 4.1 4.1 4.1 3.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 3.1 4.1 3.1
4.1 4.1 4.1 4.1 4.1 5.1 5.1 4.1 4.1 6.1 5.1 4.1 4.1 3.1 4.1 4.1 4.1 4.1 4.1 5.1 5.1 5.1 5.1 4.1 5.1 5.1 4.1 4.1 4.1 4.1 4.1 4.1 5.1 4.1 4.1 4.1
4.1 4.1 4.1 3.1 3.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 5.1 5.1 4.1 4.1 4.1 4.1 4.1 6.1 5.1 4.1 4.1 4.1 3.1 2.1 3.1 3.1 3.1 3.1 3.1 4.1 3.1 4.1
4.1 3.1 4.1 4.1 3.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 3.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 4.1 5.1 5.1 3.1 2.1 2.1 3.1 3.1 2.1 3.1 3.1 3.1 3.1 4.1
3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 2.1 2.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 2.1 2.1 3.1 3.1 3.1 3.1 3.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 3.1 3.1 3.1
4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 4.1 3.1 3.1 4.1 4.1 4.1 4.1 3.1 4.1 4.1 4.1 4.1 3.1 3.1 4.1 3.1 3.1 2.1 3.1 3.1 4.1 4.1 3.1 3.1 2.1 3.1 3.1
4.1 5.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 4.1 5.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 2.1 2.1 3.1 3.1 4.1 4.1 5.1 5.1 5.1 5.1 4.1 4.1 5.1 6.1 5.1 5.1
5.1 5.1 5.1 5.1 5.1 4.1 5.1 4.1 5.1 5.1 5.1 5.1 4.1 5.1 4.1 5.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 5.1 4.1 5.1 5.1 5.1 5.1 5.1 4.1 4.1 5.1 5.1 5.1
5.1 4.1 4.1 5.1 5.1 4.1 4.1 5.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 4.1 5.1 4.1 5.1 5.1 4.1 4.1 4.1 4.1 4.1 5.1 4.1 5.1 4.1 4.1 4.1 4.1 4.1
3.1 3.1 3.1 3.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 4.1 3.1 4.1 4.1 3.1 4.1 4.1 4.1 4.1 4.1 3.1 3.1 4.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1
3.1 3.1 3.1 3.1 4.1 4.1 4.1 4.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1 3.1
3.1 3.1 3.1 3.1 3.1 4.1 3.1 3.1 3.1 3.1 3.1 4.1 3.1 3.1 3.1 3.1 3.1 2.1 3.1 3.1 3.1 3.1 5.1 6.1 5.1 3.1 5.1 5.1 5.1 5.1 5.1 6.1 5.1 4.1 3.1 3.1
3.1 3.1 3.1 4.1 5.1 5.1 6.1 6.1 6.1 6.1 5.1 5.1 2.1 2.1 2.1 4.1 5.1 7.1 8.1 9.1 11.1 11.1 10.1 7.1 9.1 9.1 8.1 8.1 8.1 8.1 7.1 6.1 6.1 6.1 5.1 3.1
8.1 8.1 8.1 8.1 8.1 8.1 8.1 7.1 6.1 5.1 6.1 6.1 6.1 6.1 6.1 5.1 5.1 4.1 5.1 4.1 4.1 5.1 6.1 6.1 6.1 6.1 5.1 5.1 4.1 4.1 4.1 4.1 5.1 6.1 10.1 9.1
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002

Channel: HIRS4 (400 hPa)

NOAA15, using all observations

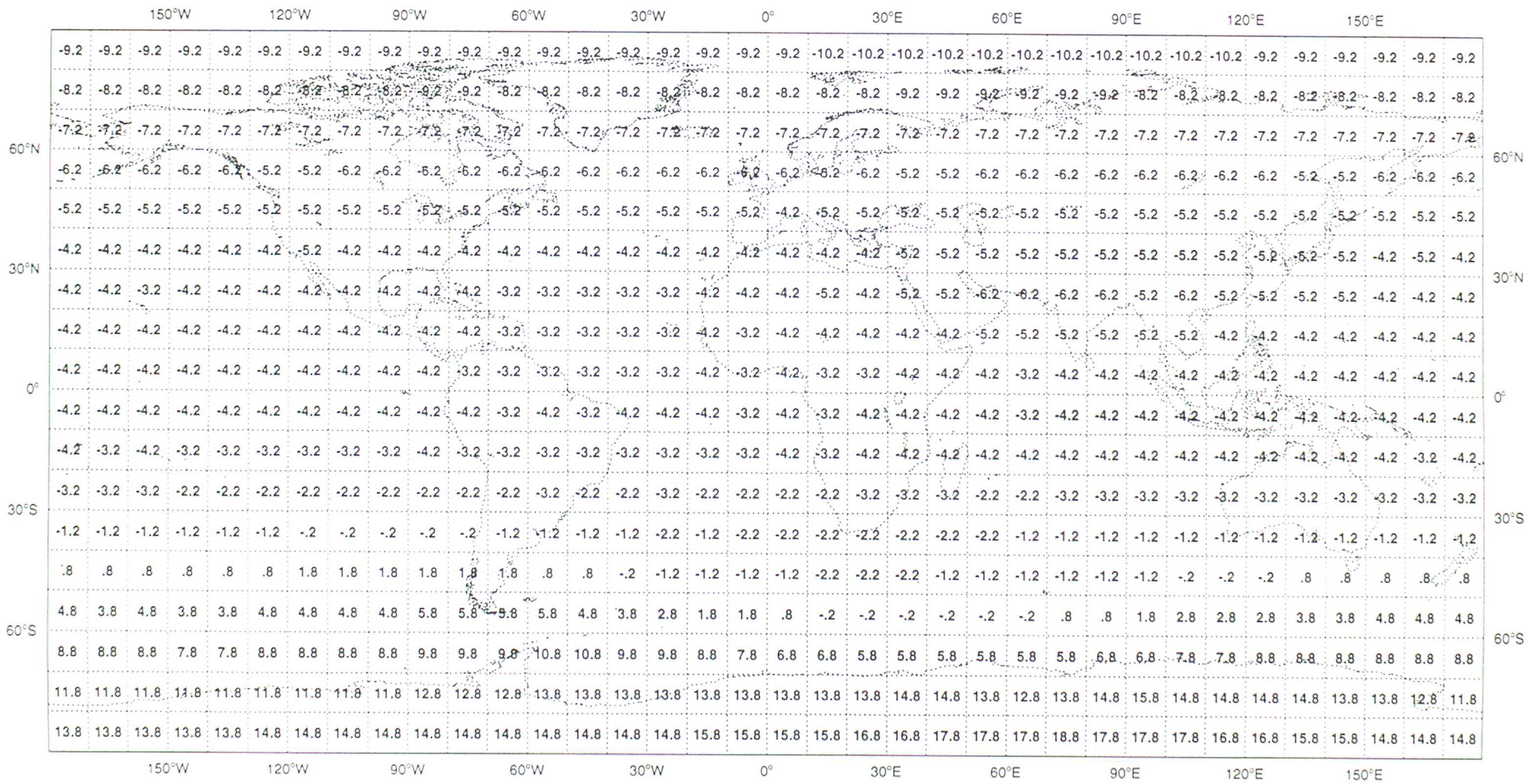

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -10.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2
-8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -9.2 -9.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -9.2 -9.2 -9.2 -9.2 -9.2 -9.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2 -8.2
-7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2 -7.2
-6.2 -6.2 -6.2 -6.2 -6.2 -5.2 -5.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -5.2 -5.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -6.2 -5.2 -5.2 -6.2 -6.2 -6.2
-5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -4.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2
-4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -5.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -4.2 -5.2 -4.2
-4.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -3.2 -3.2 -3.2 -3.2 -3.2 -4.2 -4.2 -4.2 -5.2 -4.2 -5.2 -5.2 -6.2 -6.2 -6.2 -6.2 -5.2 -6.2 -5.2 -5.2 -5.2 -5.2 -4.2 -4.2 -4.2
-4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -3.2 -3.2 -3.2 -3.2 -3.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -4.2 -5.2 -5.2 -5.2 -5.2 -5.2 -5.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2
-4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -4.2 -3.2 -4.2 -3.2 -3.2 -4.2 -4.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2
-4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -3.2 -4.2 -3.2 -4.2 -4.2 -4.2 -3.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2
-4.2 -3.2 -4.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -4.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -4.2 -3.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -4.2 -3.2 -4.2
-3.2 -3.2 -3.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -3.2 -2.2 -2.2 -3.2 -2.2 -2.2 -2.2 -2.2 -3.2 -3.2 -3.2 -2.2 -2.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2 -3.2
-1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -.2 -.2 -.2 -.2 -.2 -1.2 -1.2 -1.2 -1.2 -2.2 -1.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -2.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2
.8 .8 .8 .8 .8 .8 1.8 1.8 1.8 1.8 1.8 1.8 .8 .8 -.2 -1.2 -1.2 -1.2 -1.2 -2.2 -2.2 -2.2 -1.2 -1.2 -1.2 -1.2 -1.2 -1.2 -.2 -.2 -.2 .8 .8 .8 .8 .8
4.8 3.8 4.8 3.8 3.8 4.8 4.8 4.8 4.8 5.8 5.8 5.8 5.8 4.8 3.8 2.8 1.8 1.8 .8 -.2 -.2 -.2 -.2 -.2 -.2 .8 .8 1.8 2.8 2.8 2.8 3.8 3.8 4.8 4.8 4.8
8.8 8.8 8.8 7.8 7.8 8.8 8.8 8.8 8.8 9.8 9.8 9.8 10.8 10.8 9.8 9.8 8.8 7.8 6.8 6.8 5.8 5.8 5.8 5.8 5.8 5.8 6.8 6.8 7.8 7.8 8.8 8.8 8.8 8.8 8.8 8.8
11.8 11.8 11.8 11.8 11.8 11.8 11.8 11.8 11.8 12.8 12.8 12.8 13.8 13.8 13.8 13.8 13.8 13.8 13.8 13.8 13.8 14.8 14.8 13.8 12.8 13.8 14.8 15.8 14.8 14.8 14.8 14.8 13.8 13.8 12.8 11.8
13.8 13.8 13.8 13.8 13.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 14.8 15.8 15.8 15.8 15.8 16.8 16.8 17.8 17.8 17.8 18.8 17.8 17.8 17.8 16.8 16.8 15.8 15.8 14.8 14.8 14.8
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

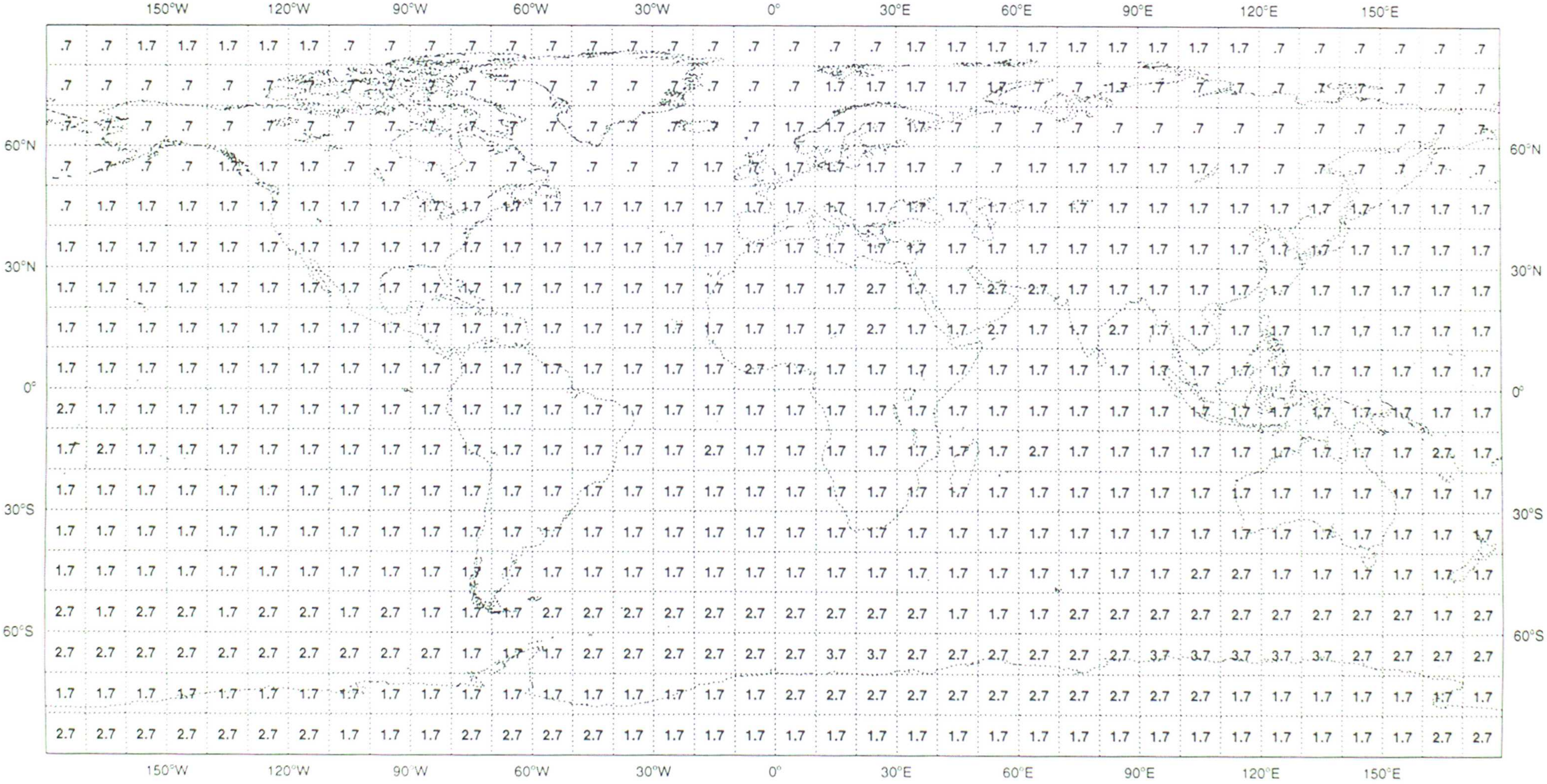

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.7 .7 1.7 1.7 1.7 1.7 1.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 1.7 1.7 1.7 1.7 1.7 .7 .7 1.7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 1.7 1.7 1.7 1.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 1.7 1.7 1.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 1.7 .7 1.7 1.7 1.7 1.7 .7 .7 1.7 1.7 1.7 1.7 1.7 1.7 .7 .7 .7 .7 .7 .7
.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7 1.7 2.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7 1.7 2.7 1.7 1.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7
2.7 1.7 2.7 2.7 1.7 2.7 2.7 1.7 2.7 1.7 1.7 1.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 1.7 1.7 1.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 1.7 2.7
2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 1.7 1.7 1.7 2.7 2.7 2.7 2.7 2.7 2.7 3.7 3.7 2.7 2.7 2.7 2.7 2.7 2.7 3.7 3.7 3.7 3.7 3.7 2.7 2.7 2.7 2.7
1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7
2.7 2.7 2.7 2.7 2.7 2.7 2.7 1.7 1.7 1.7 2.7 2.7 2.7 2.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 1.7 2.7 2.7
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

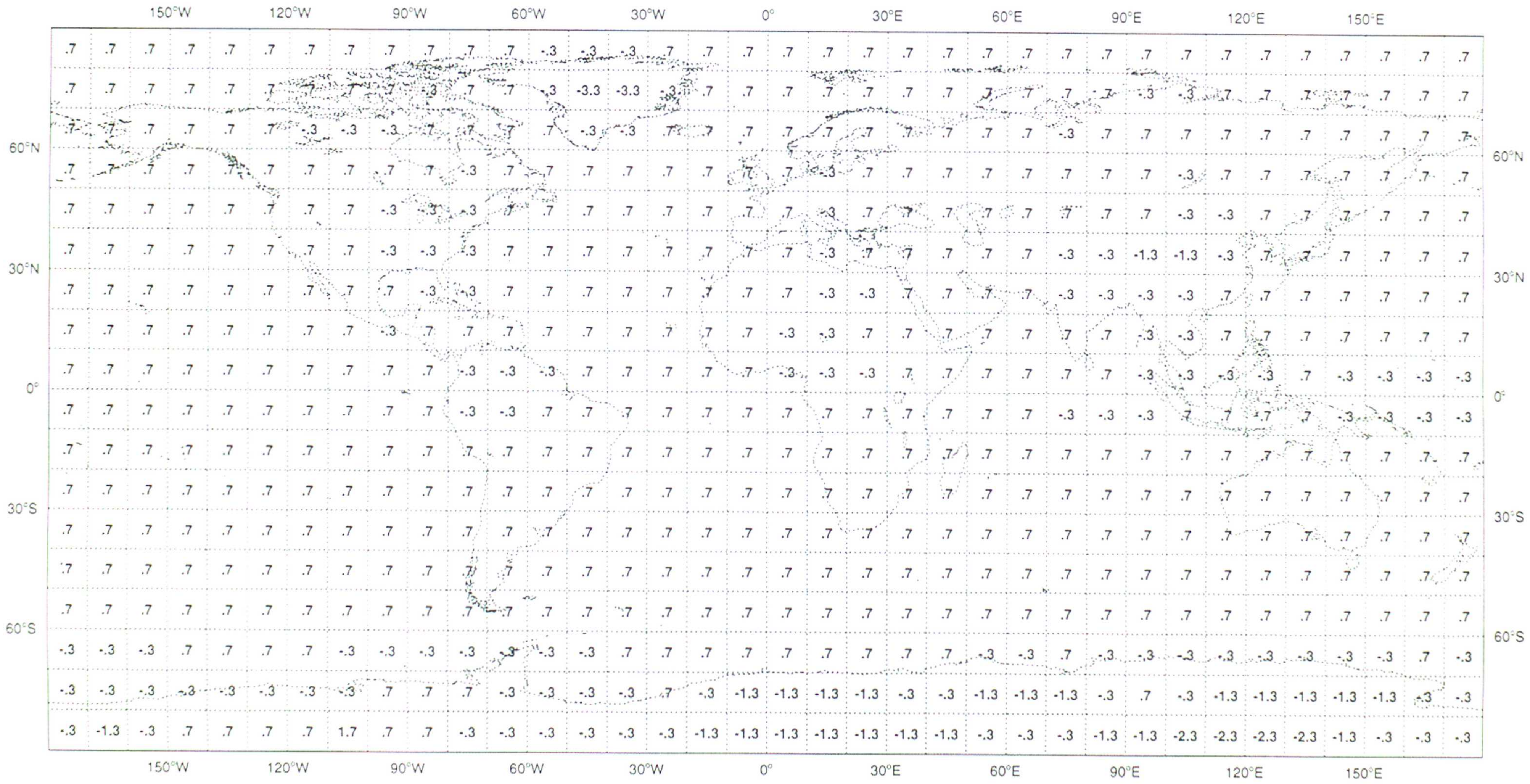

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 -.3 -3.3 -3.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 -.3 -.3 -1.3 -1.3 -.3 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 -.3 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 -.3 .7 -.3 -.3 -.3 -.3
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 -.3 .7 .7 .7 .7 -.3 -.3 -.3 -.3
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7
-.3 -.3 -.3 .7 .7 .7 .7 -.3 -.3 -.3 -.3 -.3 -.3 -.3 .7 .7 .7 .7 .7 .7 .7 .7 .7 -.3 -.3 .7 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 .7 -.3
-.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 .7 .7 .7 -.3 -.3 -.3 -.3 .7 -.3 -1.3 -1.3 -1.3 -1.3 -.3 -.3 -1.3 -1.3 -1.3 -.3 .7 -.3 -1.3 -1.3 -1.3 -1.3 -1.3 -.3 -.3
-.3 -1.3 -.3 .7 .7 .7 .7 1.7 .7 .7 -.3 -.3 -.3 -.3 -.3 -.3 -1.3 -1.3 -1.3 -1.3 -1.3 -1.3 -1.3 -.3 -.3 -.3 -1.3 -1.3 -2.3 -2.3 -2.3 -2.3 -1.3 -.3 -.3 -.3

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

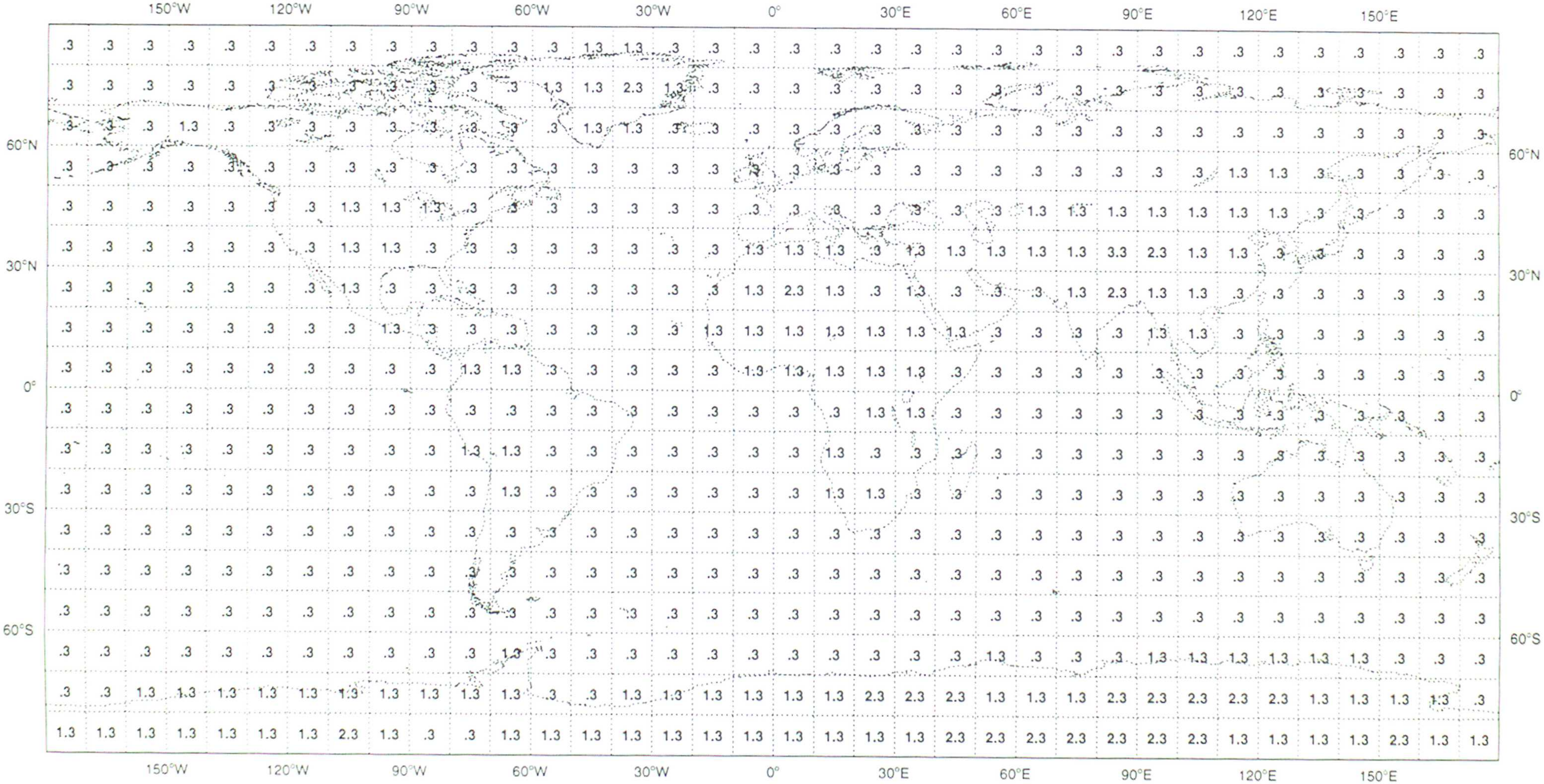

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 2.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 1.3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 1.3 .3 1.3 1.3 1.3 1.3 1.3 3.3 2.3 1.3 1.3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 2.3 1.3 .3 1.3 .3 .3 .3 1.3 2.3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 1.3 1.3 1.3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 1.3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 1.3 .3 .3 .3 1.3 1.3 1.3 1.3 1.3 1.3 .3 .3 .3
.3 .3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 .3 .3 1.3 1.3 1.3 1.3 1.3 1.3 2.3 2.3 2.3 1.3 1.3 1.3 2.3 2.3 2.3 2.3 2.3 1.3 1.3 1.3 1.3 .3
1.3 1.3 1.3 1.3 1.3 1.3 1.3 2.3 1.3 .3 .3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 2.3 2.3 2.3 2.3 2.3 2.3 2.3 1.3 1.3 1.3 1.3 2.3 1.3 1.3
60°N
30°N
0°
30°S
60°S
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

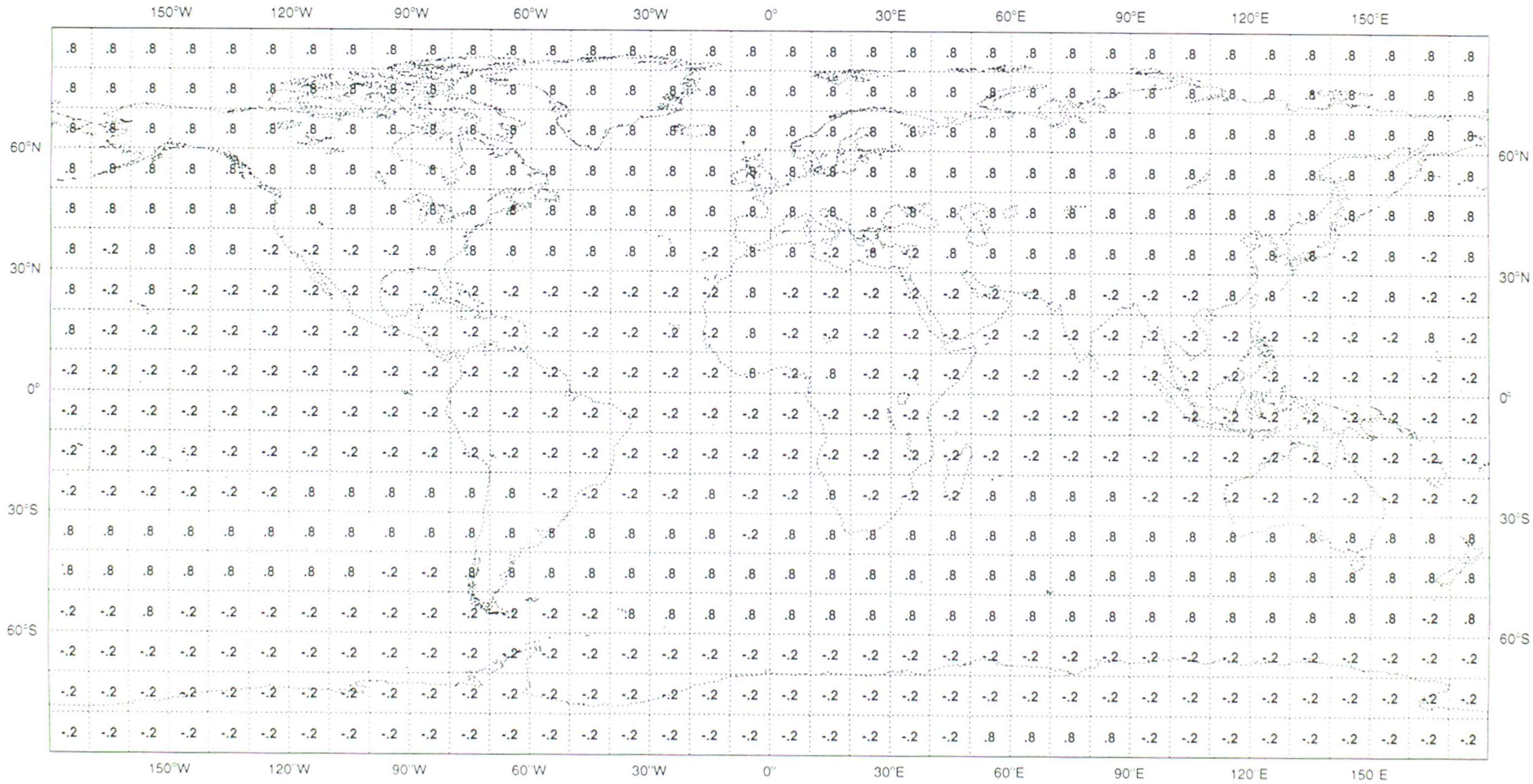

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 -.2 .8 .8 .8 -.2 -.2 -.2 -.2 .8 .8 .8 .8 .8 .8 .8 -.2 .8 .8 -.2 .8 -.2 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 -.2 .8 -.2 .8
.8 -.2 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 -.2 -.2 -.2 .8 .8 -.2 -.2 .8 -.2 -.2
.8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 -.2 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.2 -.2 -.2 -.2 -.2 -.2 .8 .8 .8 .8 .8 .8 -.2 -.2 -.2 -.2 .8 -.2 -.2 .8 -.2 -.2 -.2 .8 .8 .8 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
.8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 -.2 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
.8 .8 .8 .8 .8 .8 .8 .8 -.2 -.2 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8
-.2 -.2 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 -.2 .8
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 .8 .8 .8 .8 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

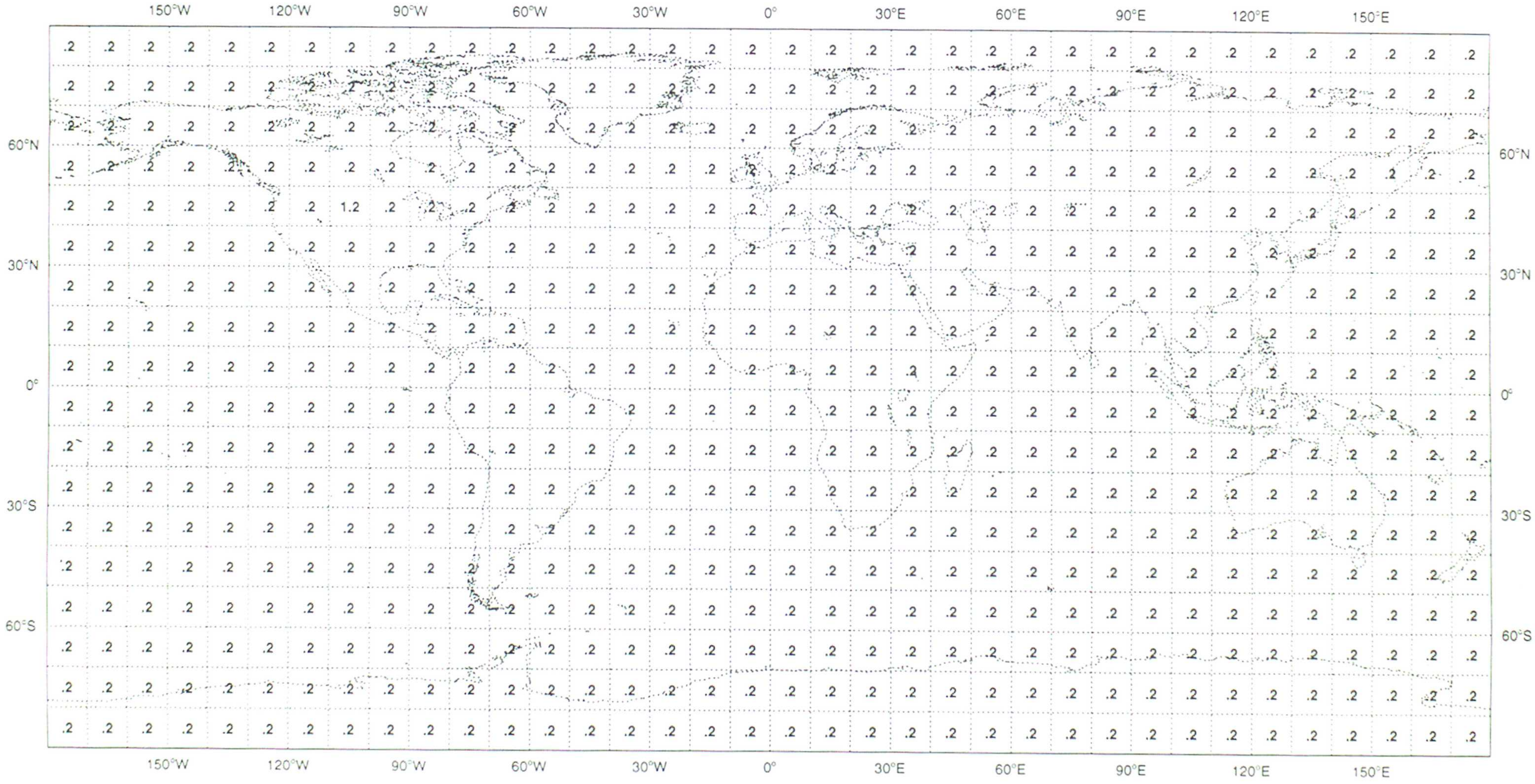

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 1.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

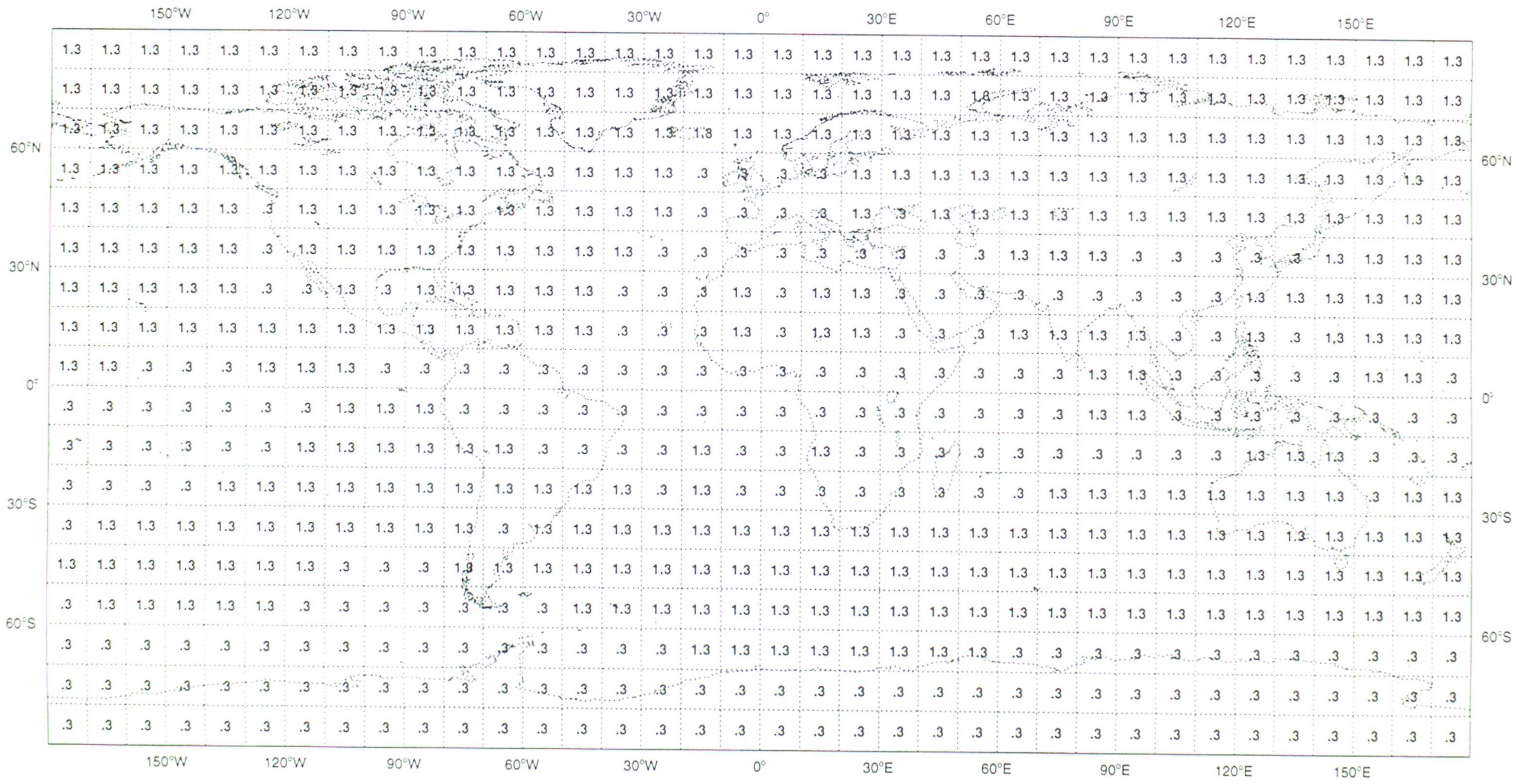
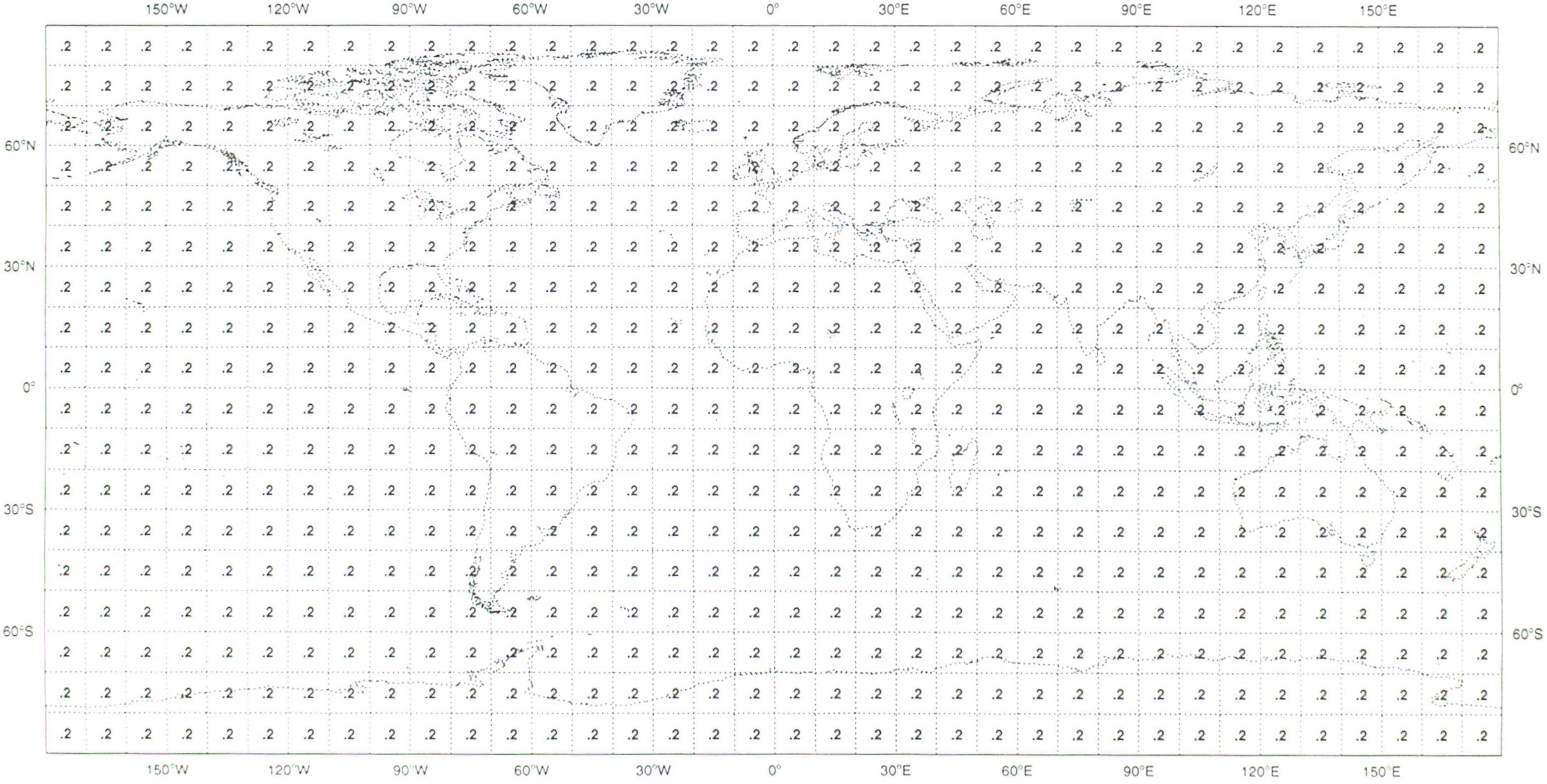

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2

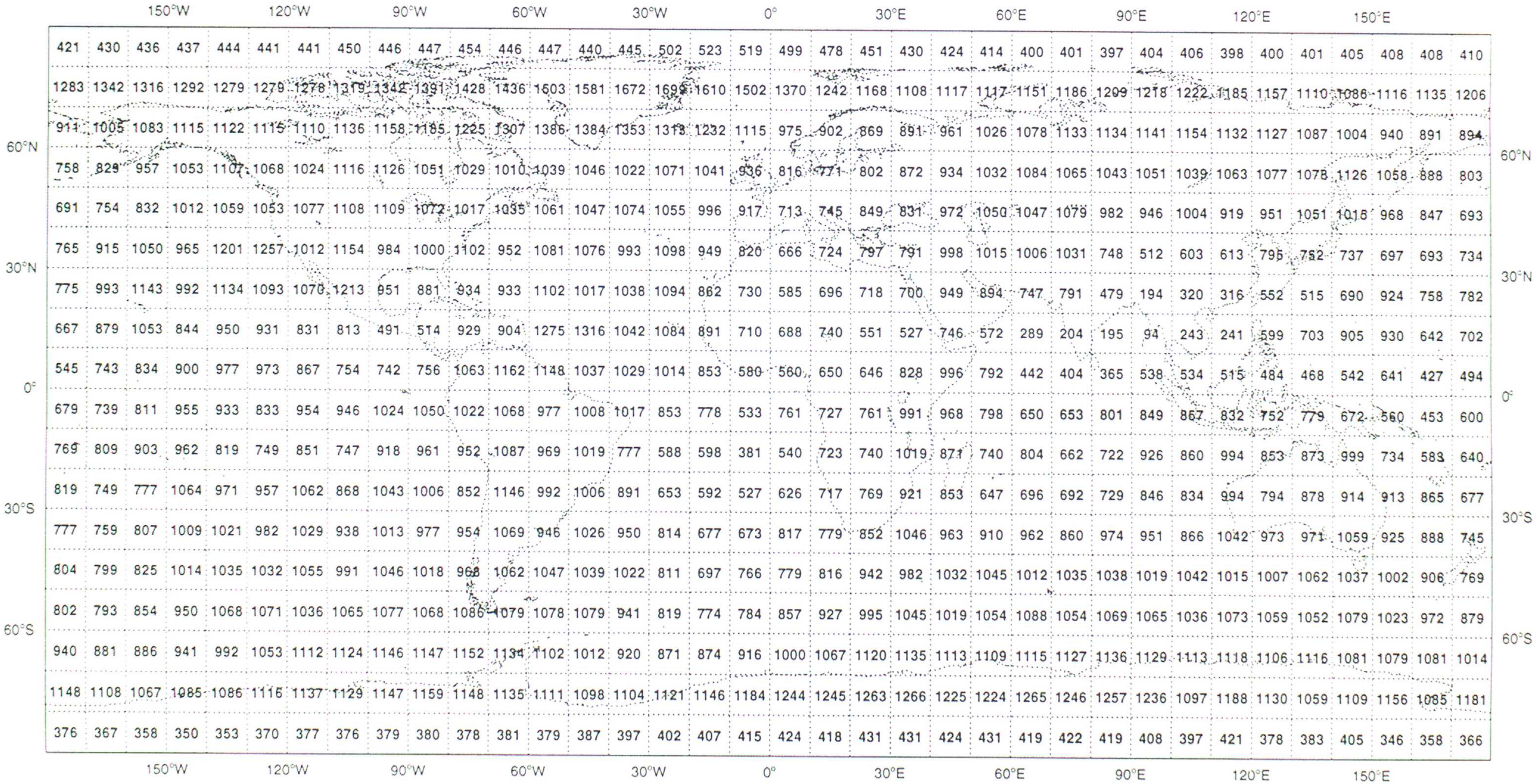


Figure 40. ATOVS mean daily count. JUNE 2002
NOAA16, using all observations
Global average number of observations in 24 hours = 572568

421	430	436	437	444	441	441	450	446	447	454	446	447	440	445	502	523	519	499	478	451	430	424	414	400	401	397	404	406	398	400	401	405	408	408	410
1283	1342	1316	1292	1279	1279	1278	1319	1342	1391	1428	1436	1503	1581	1672	1699	1610	1502	1370	1242	1168	1108	1117	1117	1151	1186	1209	1218	1222	1185	1157	1110	1086	1116	1135	1206
911	1005	1083	1115	1122	1115	1110	1136	1158	1185	1225	1307	1386	1384	1353	1313	1232	1115	975	902	869	891	961	1026	1078	1133	1134	1141	1154	1132	1127	1087	1004	940	891	894
758	829	957	1053	1107	1068	1024	1116	1126	1051	1029	1010	1039	1046	1022	1071	1041	936	816	771	802	872	934	1032	1084	1065	1043	1051	1039	1063	1077	1078	1126	1058	888	803
691	754	832	1012	1059	1053	1077	1108	1109	1072	1017	1035	1061	1047	1074	1055	996	917	713	745	849	831	972	1050	1047	1079	982	946	1004	919	951	1051	1016	968	847	693
765	915	1050	965	1201	1257	1012	1154	984	1000	1102	952	1081	1076	993	1098	949	820	666	724	797	791	998	1015	1006	1031	748	512	603	613	795	752	737	697	693	734
775	993	1143	992	1134	1093	1070	1213	951	881	934	933	1102	1017	1038	1094	862	730	585	696	718	700	949	894	747	791	479	194	320	316	552	515	690	924	758	782
667	879	1053	844	950	931	831	813	491	514	929	904	1275	1316	1042	1084	891	710	688	740	551	527	746	572	289	204	195	94	243	241	599	703	905	930	642	702
545	743	834	900	977	973	867	754	742	756	1063	1162	1148	1037	1029	1014	853	580	560	650	646	828	996	792	442	404	365	538	534	515	484	468	542	641	427	494
679	739	811	955	933	833	954	946	1024	1050	1022	1068	977	1008	1017	853	778	533	761	727	761	991	968	798	650	653	801	849	867	832	752	779	672	560	453	600
769	809	903	962	819	749	851	747	918	961	952	1087	969	1019	777	588	598	381	540	723	740	1019	871	740	804	662	722	926	860	994	853	873	999	734	583	640
819	749	777	1064	971	957	1062	868	1043	1006	852	1146	992	1006	891	653	592	527	626	717	769	921	853	647	696	692	729	846	834	994	794	878	914	913	865	677
777	759	807	1009	1021	982	1029	938	1013	977	954	1069	946	1026	950	814	677	673	817	779	852	1046	963	910	962	860	974	951	866	1042	973	971	1059	925	888	745
804	799	825	1014	1035	1032	1055	991	1046	1018	968	1062	1047	1039	1022	811	697	766	779	816	942	982	1032	1045	1012	1035	1038	1019	1042	1015	1007	1062	1037	1002	906	769
802	793	854	950	1068	1071	1036	1065	1077	1068	1086	1079	1078	1079	941	819	774	784	857	927	995	1045	1019	1054	1088	1054	1069	1065	1036	1073	1059	1052	1079	1023	972	879
940	881	886	941	992	1053	1112	1124	1146	1147	1152	1134	1102	1012	920	871	874	916	1000	1067	1120	1135	1113	1109	1115	1127	1136	1129	1113	1118	1106	1116	1081	1079	1081	1014
1148	1108	1067	1085	1086	1116	1137	1129	1147	1159	1148	1135	1111	1098	1104	1121	1146	1184	1244	1245	1263	1266	1225	1224	1265	1246	1257	1236	1097	1188	1130	1059	1109	1156	1085	1181
376	367	358	350	353	370	377	376	379	380	378	381	379	387	397	402	407	415	424	418	431	431	424	431	419	422	419	408	397	421	378	383	405	346	358	366

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

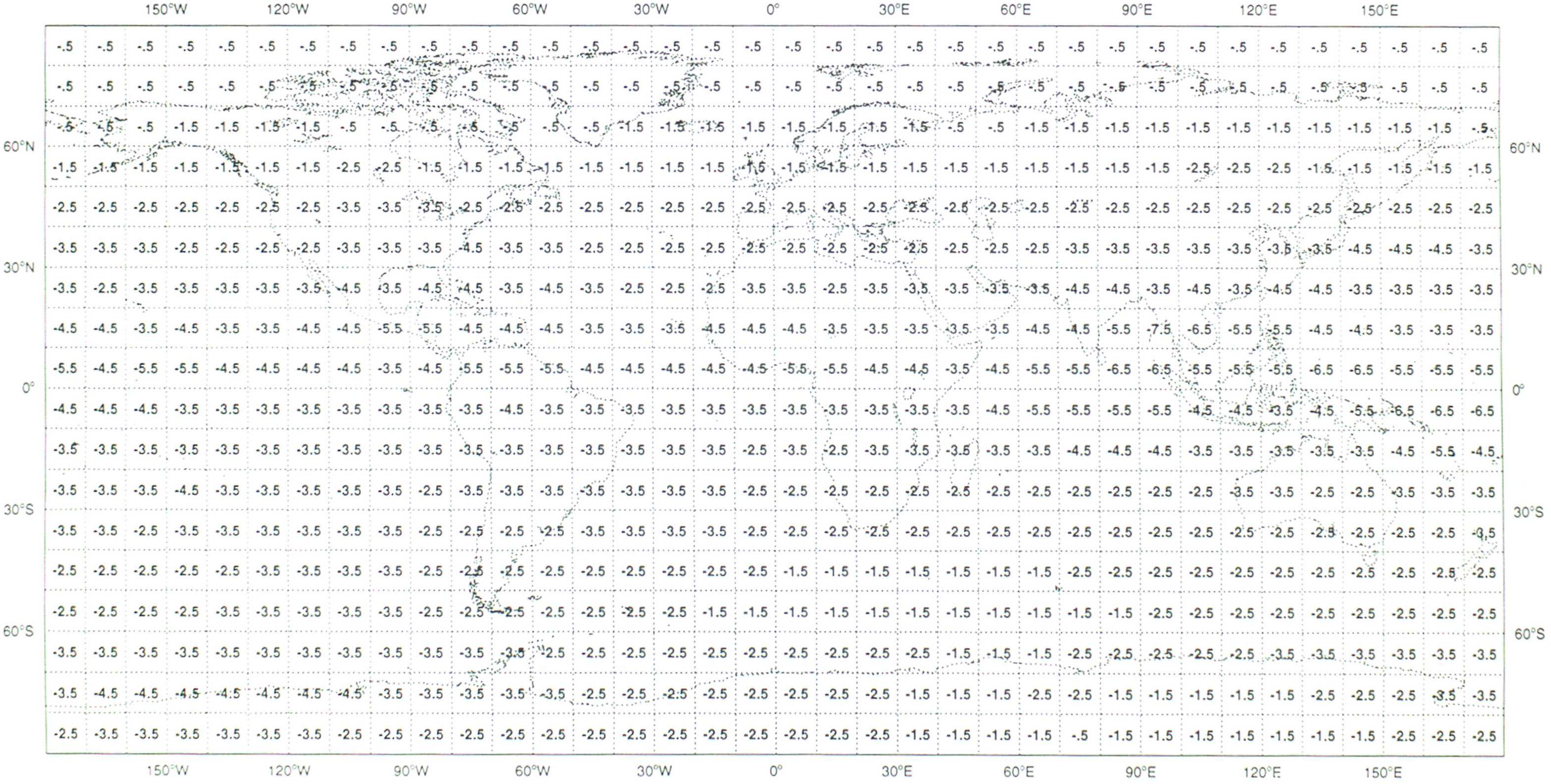

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5
-.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5
-.5 -.5 -.5 -1.5 -1.5 -1.5 -1.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -.5 -.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -.5
-1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -1.5
-2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5
-3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -4.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -4.5 -4.5 -3.5
-3.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -3.5 -4.5 -4.5 -3.5 -4.5 -3.5 -2.5 -2.5 -2.5 -3.5 -3.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -4.5 -3.5 -4.5 -3.5 -4.5 -4.5 -3.5 -3.5 -3.5 -3.5
-4.5 -4.5 -3.5 -4.5 -3.5 -3.5 -4.5 -4.5 -5.5 -5.5 -4.5 -4.5 -4.5 -3.5 -3.5 -3.5 -4.5 -4.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -4.5 -5.5 -7.5 -6.5 -5.5 -5.5 -4.5 -4.5 -3.5 -3.5 -3.5
-5.5 -4.5 -5.5 -5.5 -4.5 -4.5 -4.5 -4.5 -3.5 -4.5 -5.5 -5.5 -5.5 -4.5 -4.5 -4.5 -4.5 -4.5 -5.5 -5.5 -4.5 -4.5 -3.5 -4.5 -5.5 -5.5 -6.5 -6.5 -5.5 -5.5 -5.5 -6.5 -6.5 -5.5 -5.5 -5.5
-4.5 -4.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -5.5 -5.5 -5.5 -5.5 -4.5 -4.5 -3.5 -4.5 -5.5 -6.5 -6.5 -6.5
-3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -3.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -4.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -4.5 -5.5 -4.5
-3.5 -3.5 -3.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -2.5 -2.5 -3.5 -3.5 -3.5
-3.5 -3.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -3.5
-2.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5
-2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5
-3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5 -2.5 -2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5
-3.5 -4.5 -4.5 -4.5 -4.5 -4.5 -4.5 -4.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5 -3.5 -3.5
-2.5 -3.5 -3.5 -3.5 -3.5 -3.5 -3.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -2.5 -1.5 -1.5 -1.5 -1.5 -.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -2.5 -2.5 -2.5

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS8 (Surface)
NOAA16, using all observations

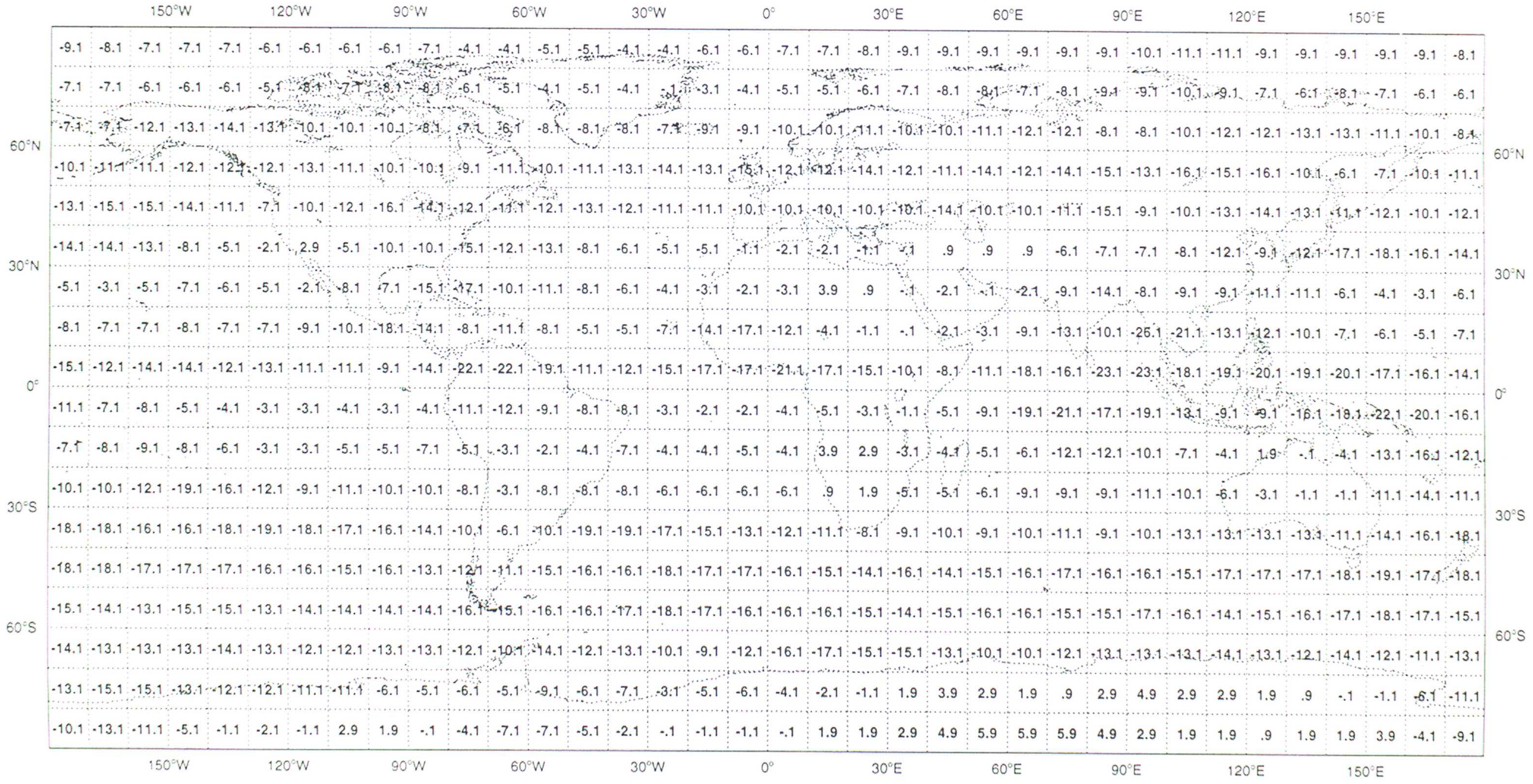
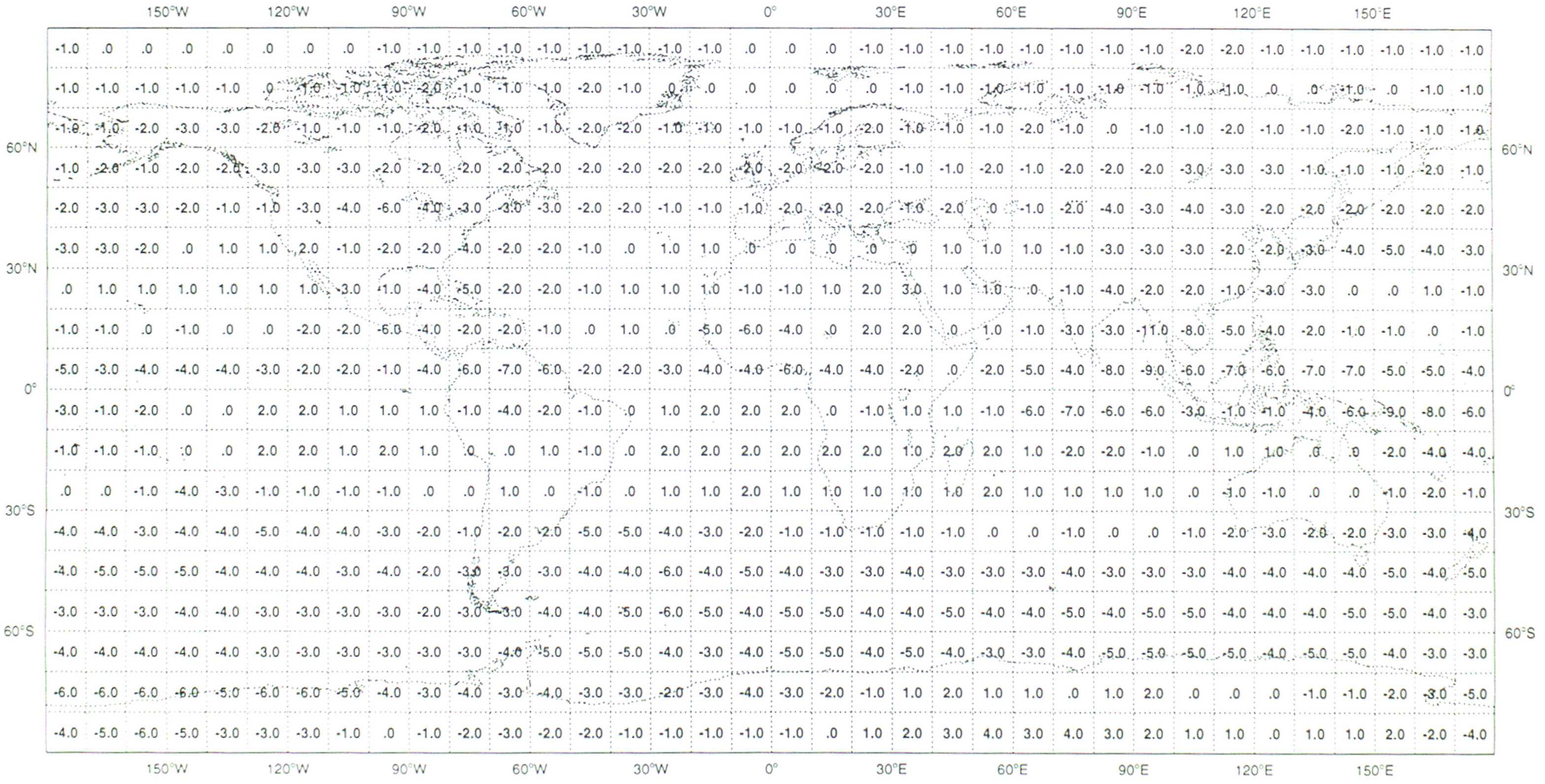
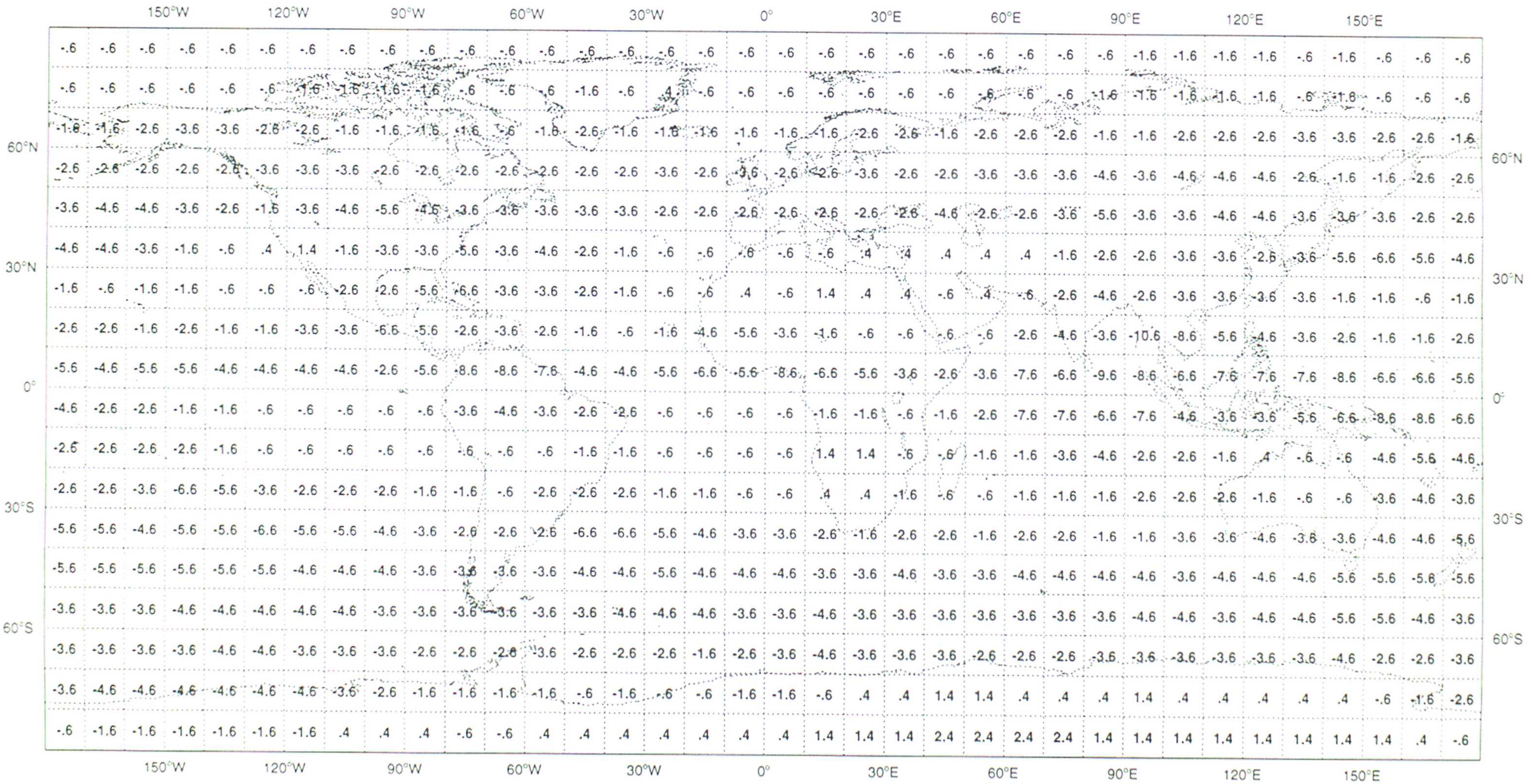

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-9.1 -8.1 -7.1 -7.1 -7.1 -6.1 -6.1 -6.1 -6.1 -7.1 -4.1 -4.1 -5.1 -5.1 -4.1 -4.1 -6.1 -6.1 -7.1 -7.1 -8.1 -9.1 -9.1 -9.1 -9.1 -9.1 -9.1 -10.1 -11.1 -11.1 -9.1 -9.1 -9.1 -9.1 -9.1 -8.1
-7.1 -7.1 -6.1 -6.1 -6.1 -5.1 -8.1 -7.1 -8.1 -8.1 -6.1 -5.1 -4.1 -5.1 -4.1 -.1 -3.1 -4.1 -5.1 -5.1 -6.1 -7.1 -8.1 -8.1 -7.1 -8.1 -9.1 -9.1 -10.1 -9.1 -7.1 -6.1 -8.1 -7.1 -6.1 -6.1
-7.1 -7.1 -12.1 -13.1 -14.1 -13.1 -10.1 -10.1 -10.1 -8.1 -7.1 -6.1 -8.1 -8.1 -8.1 -7.1 -9.1 -9.1 -10.1 -10.1 -11.1 -10.1 -10.1 -11.1 -12.1 -12.1 -8.1 -8.1 -10.1 -12.1 -12.1 -13.1 -13.1 -11.1 -10.1 -8.1
-10.1 -11.1 -11.1 -12.1 -12.1 -12.1 -13.1 -11.1 -10.1 -10.1 -9.1 -11.1 -10.1 -11.1 -13.1 -14.1 -13.1 -15.1 -12.1 -12.1 -14.1 -12.1 -11.1 -14.1 -12.1 -14.1 -15.1 -13.1 -16.1 -15.1 -16.1 -10.1 -6.1 -7.1 -10.1 -11.1
-13.1 -15.1 -15.1 -14.1 -11.1 -7.1 -10.1 -12.1 -16.1 -14.1 -12.1 -11.1 -12.1 -13.1 -12.1 -11.1 -11.1 -10.1 -10.1 -10.1 -10.1 -10.1 -14.1 -10.1 -10.1 -11.1 -15.1 -9.1 -10.1 -13.1 -14.1 -13.1 -11.1 -12.1 -10.1 -12.1
-14.1 -14.1 -13.1 -8.1 -5.1 -2.1 2.9 -5.1 -10.1 -10.1 -15.1 -12.1 -13.1 -8.1 -6.1 -5.1 -5.1 -1.1 -2.1 -2.1 -1.1 -.1 .9 .9 .9 -6.1 -7.1 -7.1 -8.1 -12.1 -9.1 -12.1 -17.1 -18.1 -16.1 -14.1
-5.1 -3.1 -5.1 -7.1 -6.1 -5.1 -2.1 -8.1 -7.1 -15.1 -17.1 -10.1 -11.1 -8.1 -6.1 -4.1 -3.1 -2.1 -3.1 3.9 .9 -.1 -2.1 -.1 -2.1 -9.1 -14.1 -8.1 -9.1 -9.1 -11.1 -11.1 -6.1 -4.1 -3.1 -6.1
-8.1 -7.1 -7.1 -8.1 -7.1 -7.1 -9.1 -10.1 -18.1 -14.1 -8.1 -11.1 -8.1 -5.1 -5.1 -7.1 -14.1 -17.1 -12.1 -4.1 -1.1 -.1 -2.1 -3.1 -9.1 -13.1 -10.1 -26.1 -21.1 -13.1 -12.1 -10.1 -7.1 -6.1 -5.1 -7.1
-15.1 -12.1 -14.1 -14.1 -12.1 -13.1 -11.1 -11.1 -9.1 -14.1 -22.1 -22.1 -19.1 -11.1 -12.1 -15.1 -17.1 -17.1 -21.1 -17.1 -15.1 -10.1 -8.1 -11.1 -18.1 -16.1 -23.1 -23.1 -18.1 -19.1 -20.1 -19.1 -20.1 -17.1 -16.1 -14.1
-11.1 -7.1 -8.1 -5.1 -4.1 -3.1 -3.1 -4.1 -3.1 -4.1 -11.1 -12.1 -9.1 -8.1 -8.1 -3.1 -2.1 -2.1 -4.1 -5.1 -3.1 -1.1 -5.1 -9.1 -19.1 -21.1 -17.1 -19.1 -13.1 -9.1 -9.1 -16.1 -18.1 -22.1 -20.1 -16.1
-7.1 -8.1 -9.1 -8.1 -6.1 -3.1 -3.1 -5.1 -5.1 -7.1 -5.1 -3.1 -2.1 -4.1 -7.1 -4.1 -4.1 -5.1 -4.1 3.9 2.9 -3.1 -4.1 -5.1 -6.1 -12.1 -12.1 -10.1 -7.1 -4.1 1.9 -.1 -4.1 -13.1 -16.1 -12.1
-10.1 -10.1 -12.1 -19.1 -16.1 -12.1 -9.1 -11.1 -10.1 -10.1 -8.1 -3.1 -8.1 -8.1 -8.1 -6.1 -6.1 -6.1 -6.1 .9 1.9 -5.1 -5.1 -6.1 -9.1 -9.1 -9.1 -11.1 -10.1 -6.1 -3.1 -1.1 -1.1 -11.1 -14.1 -11.1
-18.1 -18.1 -16.1 -16.1 -18.1 -19.1 -18.1 -17.1 -16.1 -14.1 -10.1 -6.1 -10.1 -19.1 -19.1 -17.1 -15.1 -13.1 -12.1 -11.1 -8.1 -9.1 -10.1 -9.1 -10.1 -11.1 -9.1 -10.1 -13.1 -13.1 -13.1 -13.1 -11.1 -14.1 -16.1 -18.1
-18.1 -18.1 -17.1 -17.1 -17.1 -16.1 -16.1 -15.1 -16.1 -13.1 -12.1 -11.1 -15.1 -16.1 -16.1 -18.1 -17.1 -17.1 -16.1 -15.1 -14.1 -16.1 -14.1 -15.1 -16.1 -17.1 -16.1 -16.1 -15.1 -17.1 -17.1 -17.1 -18.1 -19.1 -17.1 -18.1
-15.1 -14.1 -13.1 -15.1 -15.1 -13.1 -14.1 -14.1 -14.1 -14.1 -16.1 -15.1 -16.1 -16.1 -17.1 -18.1 -17.1 -16.1 -16.1 -16.1 -15.1 -14.1 -15.1 -16.1 -16.1 -15.1 -15.1 -17.1 -16.1 -14.1 -15.1 -16.1 -17.1 -18.1 -17.1 -15.1
-14.1 -13.1 -13.1 -13.1 -14.1 -13.1 -12.1 -12.1 -13.1 -13.1 -12.1 -10.1 -14.1 -12.1 -13.1 -10.1 -9.1 -12.1 -16.1 -17.1 -15.1 -15.1 -13.1 -10.1 -10.1 -12.1 -13.1 -13.1 -13.1 -14.1 -13.1 -12.1 -14.1 -12.1 -11.1 -13.1
-13.1 -15.1 -15.1 -13.1 -12.1 -12.1 -11.1 -11.1 -6.1 -5.1 -6.1 -5.1 -9.1 -6.1 -7.1 -3.1 -5.1 -6.1 -4.1 -2.1 -1.1 1.9 3.9 2.9 1.9 .9 2.9 4.9 2.9 2.9 1.9 .9 -.1 -1.1 -6.1 -11.1
-10.1 -13.1 -11.1 -5.1 -1.1 -2.1 -1.1 2.9 1.9 -.1 -4.1 -7.1 -7.1 -5.1 -2.1 -.1 -1.1 -1.1 -.1 1.9 1.9 2.9 4.9 5.9 5.9 5.9 4.9 2.9 1.9 1.9 .9 1.9 1.9 3.9 -4.1 -9.1

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-1.0	.0	.0	.0	.0	.0	.0	.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	.0	.0	.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
-1.0	-1.0	-1.0	-1.0	-1.0	.0	-1.0	-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-2.0	-1.0	.0	.0	.0	.0	.0	.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	.0	.0	-1.0	.0	-1.0	-1.0
-1.0	-1.0	-2.0	-3.0	-3.0	-2.0	-1.0	-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	-2.0	-1.0	-1.0	-1.0	-2.0	-1.0	.0	-1.0	-1.0	-2.0	-1.0	-1.0	-2.0	-1.0	-1.0	-1.0
-1.0	-2.0	-1.0	-2.0	-2.0	-3.0	-3.0	-3.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-1.0	-1.0	-2.0	-1.0	-2.0	-2.0	-2.0	-3.0	-3.0	-3.0	-1.0	-1.0	-1.0	-2.0	-1.0
-2.0	-3.0	-3.0	-2.0	-1.0	-1.0	-3.0	-4.0	-6.0	-4.0	-3.0	-3.0	-3.0	-2.0	-2.0	-1.0	-1.0	-1.0	-2.0	-2.0	-2.0	-1.0	-2.0	.0	-1.0	-2.0	-4.0	-3.0	-4.0	-3.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
-3.0	-3.0	-2.0	.0	1.0	1.0	2.0	-1.0	-2.0	-2.0	-4.0	-2.0	-2.0	-1.0	.0	1.0	1.0	.0	.0	.0	.0	.0	1.0	1.0	1.0	-1.0	-3.0	-3.0	-3.0	-2.0	-2.0	-3.0	-4.0	-5.0	-4.0	-3.0
.0	1.0	1.0	1.0	1.0	1.0	1.0	-3.0	-1.0	-4.0	-5.0	-2.0	-2.0	-1.0	1.0	1.0	1.0	-1.0	-1.0	1.0	2.0	3.0	1.0	1.0	.0	-1.0	-4.0	-2.0	-2.0	-1.0	-3.0	-3.0	.0	.0	1.0	-1.0
-1.0	-1.0	.0	-1.0	.0	.0	-2.0	-2.0	-6.0	-4.0	-2.0	-2.0	-1.0	.0	1.0	.0	-5.0	-6.0	-4.0	.0	2.0	2.0	.0	1.0	-1.0	-3.0	-3.0	-11.0	-8.0	-5.0	-4.0	-2.0	-1.0	-1.0	.0	-1.0
-5.0	-3.0	-4.0	-4.0	-4.0	-3.0	-2.0	-2.0	-1.0	-4.0	-6.0	-7.0	-6.0	-2.0	-2.0	-3.0	-4.0	-4.0	-6.0	-4.0	-4.0	-2.0	.0	-2.0	-5.0	-4.0	-8.0	-9.0	-6.0	-7.0	-6.0	-7.0	-7.0	-5.0	-5.0	-4.0
-3.0	-1.0	-2.0	.0	.0	2.0	2.0	1.0	1.0	1.0	-1.0	-4.0	-2.0	-1.0	.0	1.0	2.0	2.0	2.0	.0	-1.0	1.0	1.0	-1.0	-6.0	-7.0	-6.0	-6.0	-3.0	-1.0	-1.0	-4.0	-6.0	-9.0	-8.0	-6.0
-1.0	-1.0	-1.0	.0	.0	2.0	2.0	1.0	2.0	1.0	.0	.0	1.0	-1.0	.0	2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	2.0	1.0	-2.0	-2.0	-1.0	.0	1.0	1.0	.0	.0	-2.0	-4.0	-4.0
.0	.0	-1.0	-4.0	-3.0	-1.0	-1.0	-1.0	-1.0	.0	.0	1.0	.0	-1.0	.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0	.0	-1.0	-1.0	.0	.0	-1.0	-2.0	-1.0
-4.0	-4.0	-3.0	-4.0	-4.0	-5.0	-4.0	-4.0	-3.0	-2.0	-1.0	-2.0	-2.0	-5.0	-5.0	-4.0	-3.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	.0	.0	-1.0	.0	.0	-1.0	-2.0	-3.0	-2.0	-2.0	-3.0	-3.0	-4.0
-4.0	-5.0	-5.0	-5.0	-4.0	-4.0	-4.0	-3.0	-4.0	-2.0	-3.0	-3.0	-3.0	-4.0	-4.0	-6.0	-4.0	-5.0	-4.0	-3.0	-3.0	-4.0	-3.0	-3.0	-3.0	-4.0	-3.0	-3.0	-3.0	-4.0	-4.0	-4.0	-4.0	-5.0	-4.0	-5.0
-3.0	-3.0	-3.0	-4.0	-4.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	-4.0	-4.0	-5.0	-6.0	-5.0	-4.0	-5.0	-5.0	-4.0	-4.0	-5.0	-4.0	-4.0	-5.0	-4.0	-5.0	-5.0	-4.0	-4.0	-4.0	-5.0	-5.0	-4.0	-3.0
-4.0	-4.0	-4.0	-4.0	-4.0	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0	-4.0	-5.0	-5.0	-5.0	-4.0	-3.0	-4.0	-5.0	-5.0	-4.0	-5.0	-4.0	-3.0	-3.0	-4.0	-5.0	-5.0	-5.0	-5.0	-4.0	-5.0	-5.0	-4.0	-3.0	-3.0
-6.0	-6.0	-6.0	-6.0	-5.0	-6.0	-6.0	-5.0	-4.0	-3.0	-4.0	-3.0	-4.0	-3.0	-3.0	-2.0	-3.0	-4.0	-3.0	-2.0	-1.0	1.0	2.0	1.0	1.0	.0	1.0	2.0	.0	.0	.0	-1.0	-1.0	-2.0	-3.0	-5.0
-4.0	-5.0	-6.0	-5.0	-3.0	-3.0	-3.0	-1.0	.0	-1.0	-2.0	-3.0	-2.0	-2.0	-1.0	-1.0	-1.0	-1.0	-1.0	.0	1.0	2.0	3.0	4.0	3.0	4.0	3.0	2.0	1.0	1.0	.0	1.0	1.0	2.0	-2.0	-4.0

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-1.6	-1.6	-1.6	-1.6	-.6	-1.6	-.6	-.6	-.6
-.6	-.6	-.6	-.6	-.6	-.6	-1.6	-1.6	-1.6	-1.6	-.6	-.6	-.6	-1.6	-.6	.4	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-1.6	-1.6	-1.6	-1.6	-1.6	-.6	-1.6	-.6	-.6	-.6
-1.6	-1.6	-2.6	-3.6	-3.6	-2.6	-2.6	-1.6	-1.6	-1.6	-1.6	-.6	-1.6	-2.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-2.6	-2.6	-1.6	-2.6	-2.6	-2.6	-1.6	-1.6	-2.6	-2.6	-2.6	-3.6	-3.6	-2.6	-2.6	-1.6
-2.6	-2.6	-2.6	-2.6	-2.6	-3.6	-3.6	-3.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-3.6	-2.6	-3.6	-2.6	-2.6	-3.6	-2.6	-2.6	-3.6	-3.6	-3.6	-4.6	-3.6	-4.6	-4.6	-4.6	-2.6	-1.6	-1.6	-2.6	-2.6
-3.6	-4.6	-4.6	-3.6	-2.6	-1.6	-3.6	-4.6	-5.6	-4.6	-3.6	-3.6	-3.6	-3.6	-3.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	-4.6	-2.6	-2.6	-3.6	-5.6	-3.6	-3.6	-4.6	-4.6	-3.6	-3.6	-3.6	-2.6	-2.6
-4.6	-4.6	-3.6	-1.6	-.6	.4	1.4	-1.6	-3.6	-3.6	-5.6	-3.6	-4.6	-2.6	-1.6	-.6	-.6	-.6	-.6	-.6	.4	.4	.4	.4	.4	-1.6	-2.6	-2.6	-3.6	-3.6	-2.6	-3.6	-5.6	-6.6	-5.6	-4.6
-1.6	-.6	-1.6	-1.6	-.6	-.6	-.6	-2.6	-2.6	-5.6	-6.6	-3.6	-3.6	-2.6	-1.6	-.6	-.6	.4	-.6	1.4	.4	.4	-.6	.4	-.6	-2.6	-4.6	-2.6	-3.6	-3.6	-3.6	-3.6	-1.6	-1.6	-.6	-1.6
-2.6	-2.6	-1.6	-2.6	-1.6	-1.6	-3.6	-3.6	-6.6	-5.6	-2.6	-3.6	-2.6	-1.6	-.6	-1.6	-4.6	-5.6	-3.6	-1.6	-.6	-.6	-.6	-.6	-2.6	-4.6	-3.6	-10.6	-8.6	-5.6	-4.6	-3.6	-2.6	-1.6	-1.6	-2.6
-5.6	-4.6	-5.6	-5.6	-4.6	-4.6	-4.6	-4.6	-2.6	-5.6	-8.6	-8.6	-7.6	-4.6	-4.6	-5.6	-6.6	-5.6	-8.6	-6.6	-5.6	-3.6	-2.6	-3.6	-7.6	-6.6	-9.6	-8.6	-6.6	-7.6	-7.6	-7.6	-8.6	-6.6	-6.6	-5.6
-4.6	-2.6	-2.6	-1.6	-1.6	-.6	-.6	-.6	-.6	-.6	-3.6	-4.6	-3.6	-2.6	-2.6	-.6	-.6	-.6	-.6	-1.6	-1.6	-.6	-1.6	-2.6	-7.6	-7.6	-6.6	-7.6	-4.6	-3.6	-3.6	-5.6	-6.6	-8.6	-8.6	-6.6
-2.6	-2.6	-2.6	-2.6	-1.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-1.6	-1.6	-.6	-.6	-.6	-.6	1.4	1.4	-.6	-.6	-1.6	-1.6	-3.6	-4.6	-2.6	-2.6	-1.6	.4	-.6	-.6	-4.6	-5.6	-4.6
-2.6	-2.6	-3.6	-6.6	-5.6	-3.6	-2.6	-2.6	-2.6	-1.6	-1.6	-.6	-2.6	-2.6	-2.6	-1.6	-1.6	-.6	-.6	.4	.4	-1.6	-.6	-.6	-1.6	-1.6	-1.6	-2.6	-2.6	-2.6	-1.6	-.6	-.6	-3.6	-4.6	-3.6
-5.6	-5.6	-4.6	-5.6	-5.6	-6.6	-5.6	-5.6	-4.6	-3.6	-2.6	-2.6	-2.6	-6.6	-6.6	-5.6	-4.6	-3.6	-3.6	-2.6	-1.6	-2.6	-2.6	-1.6	-2.6	-2.6	-1.6	-1.6	-3.6	-3.6	-4.6	-3.6	-3.6	-4.6	-4.6	-5.6
-5.6	-5.6	-5.6	-5.6	-5.6	-5.6	-4.6	-4.6	-4.6	-3.6	-3.6	-3.6	-3.6	-4.6	-4.6	-5.6	-4.6	-4.6	-4.6	-3.6	-3.6	-4.6	-3.6	-3.6	-4.6	-4.6	-4.6	-4.6	-3.6	-4.6	-4.6	-4.6	-5.6	-5.6	-5.6	-5.6
-3.6	-3.6	-3.6	-4.6	-4.6	-4.6	-4.6	-4.6	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-4.6	-4.6	-4.6	-3.6	-3.6	-4.6	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-4.6	-4.6	-3.6	-4.6	-4.6	-5.6	-5.6	-4.6	-3.6
-3.6	-3.6	-3.6	-3.6	-4.6	-4.6	-3.6	-3.6	-3.6	-2.6	-2.6	-2.6	-3.6	-2.6	-2.6	-2.6	-1.6	-2.6	-3.6	-4.6	-3.6	-3.6	-3.6	-2.6	-2.6	-2.6	-3.6	-3.6	-3.6	-3.6	-3.6	-3.6	-4.6	-2.6	-2.6	-3.6
-3.6	-4.6	-4.6	-4.6	-4.6	-4.6	-4.6	-3.6	-2.6	-1.6	-1.6	-1.6	-1.6	-.6	-1.6	-.6	-.6	-1.6	-1.6	-.6	.4	.4	1.4	1.4	.4	.4	.4	1.4	.4	.4	.4	.4	.4	-.6	-1.6	-2.6
-.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	.4	.4	.4	-.6	-.6	.4	.4	.4	.4	.4	.4	.4	1.4	1.4	1.4	2.4	2.4	2.4	2.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	.4	-.6

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

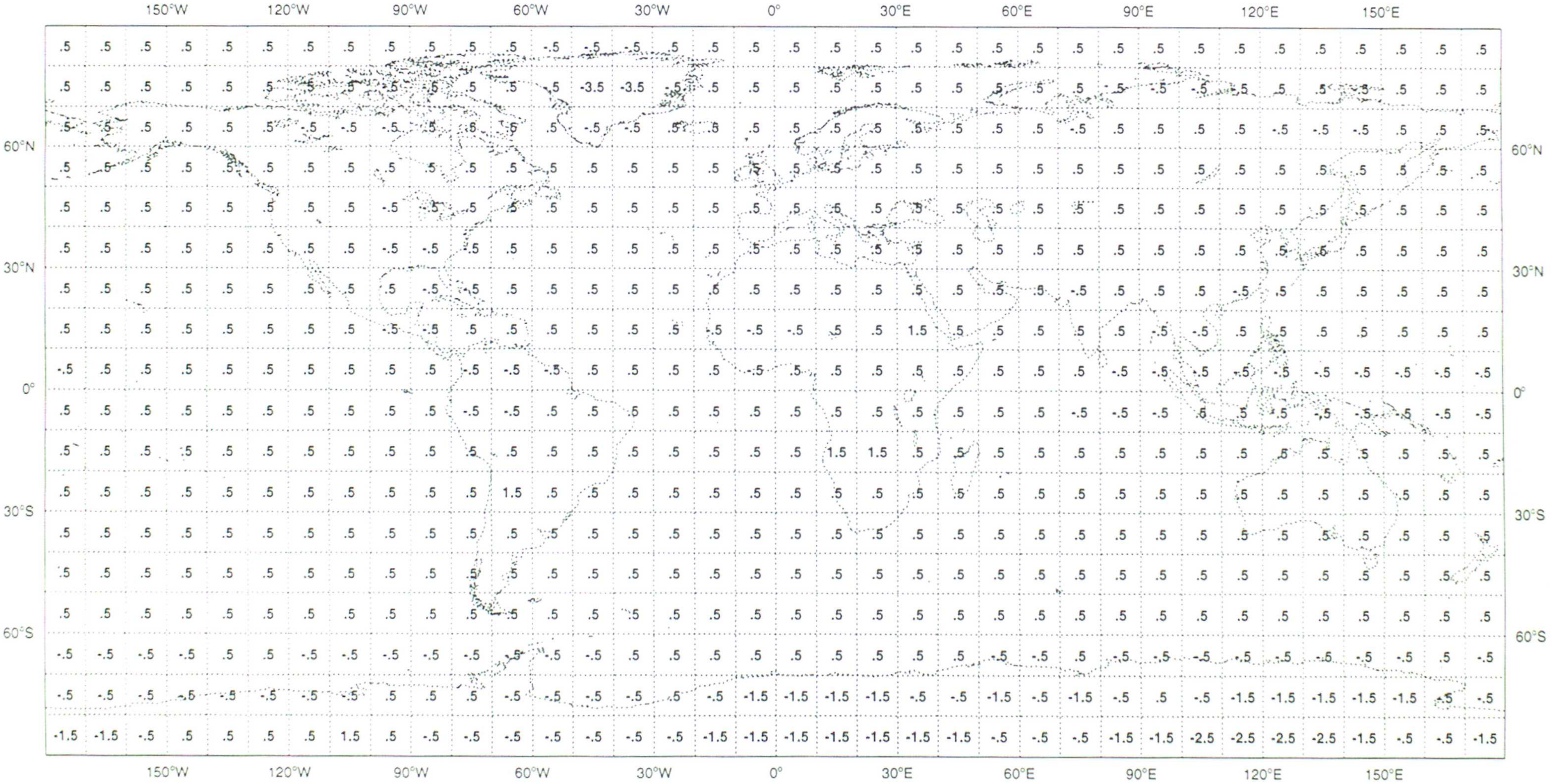

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -3.5 -3.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 -.5 .5 .5 -.5 .5 .5 .5
.5 .5 .5 .5 .5 .5 -.5 -.5 -.5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 .5 .5 .5 .5 -.5 -.5 -.5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 .5 .5 .5 -.5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 .5 .5 1.5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5
-.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 .5 .5 .5 .5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 -.5 .6 .5 .5 -.5 -.5 -.5 -.5 -.5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 1.5 1.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 1.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
-.5 -.5 -.5 -.5 .5 .5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 -.5 -.5 .5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 .5 -.5
-.5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 .5 .5 .5 -.5 -.5 -.5 -.5 .5 -.5 -1.5 -1.5 -1.5 -1.5 -.5 -.5 -1.5 -.5 -1.5 -.5 .5 -.5 -1.5 -1.5 -1.5 -1.5 -1.5 -.5 -.5
-1.5 -1.5 -.5 .5 .5 .5 .5 1.5 .5 -.5 -.5 -.5 -.5 -.5 -.5 -.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -1.5 -.5 -.5 -.5 -1.5 -1.5 -2.5 -2.5 -2.5 -2.5 -1.5 -.5 -.5 -1.5

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations

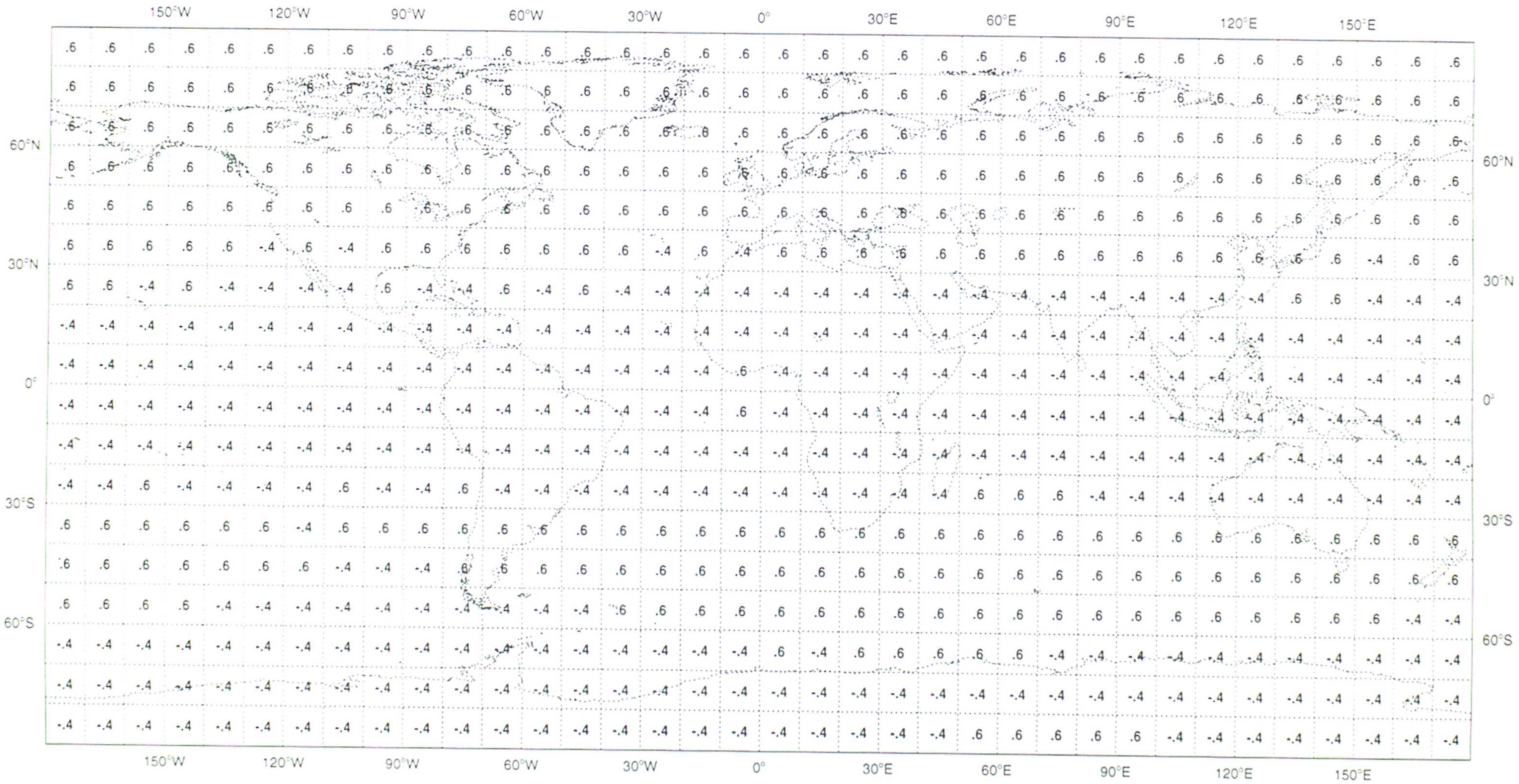

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

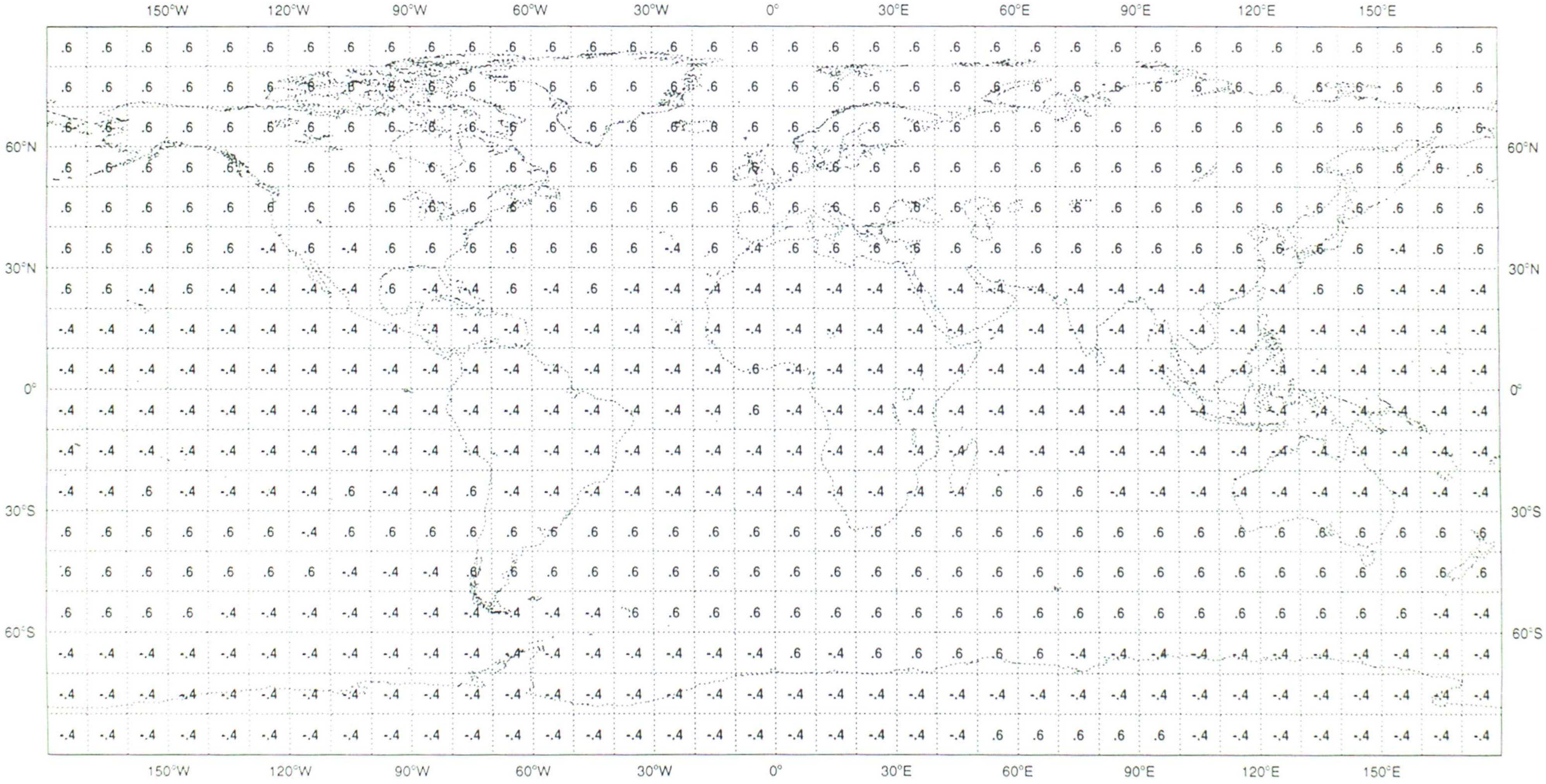

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 -.4 .6 -.4 .6 .6 .6 .6 .6 .6 .6 -.4 .6 -.4 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 -.4 .6 .6
.6 .6 -.4 .6 -.4 -.4 -.4 -.4 .6 -.4 -.4 .6 -.4 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 .6 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 .6 -.4 -.4 -.4 -.4 .6 -.4 -.4 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 .6 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
.6 .6 .6 .6 .6 .6 -.4 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 .6 .6 .6 -.4 -.4 -.4 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6
.6 .6 .6 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 .6 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 -.4 .6 .6 .6 .6 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4
-.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4 .6 .6 .6 .6 .6 -.4 -.4 -.4 -.4 -.4 -.4 -.4 -.4

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

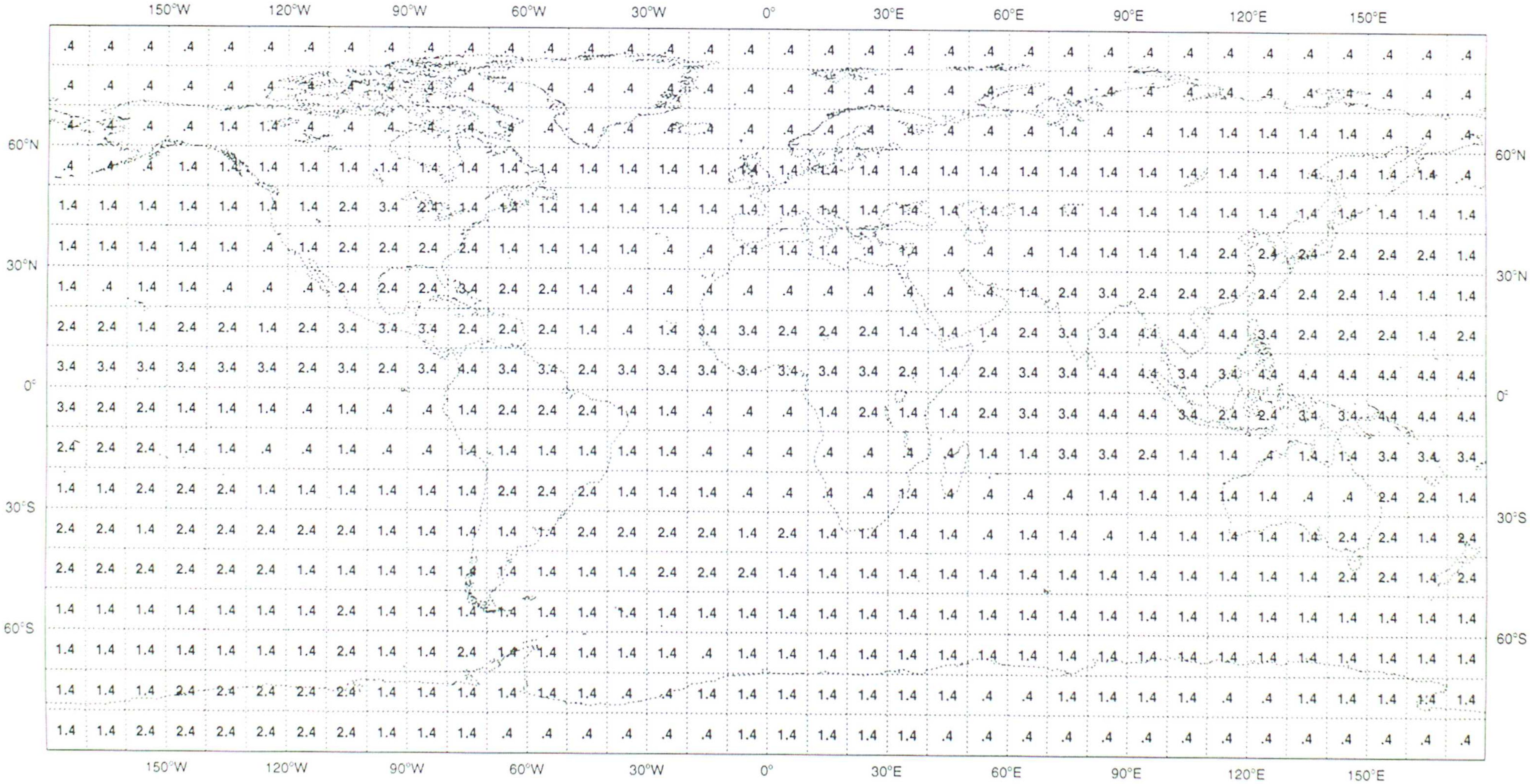
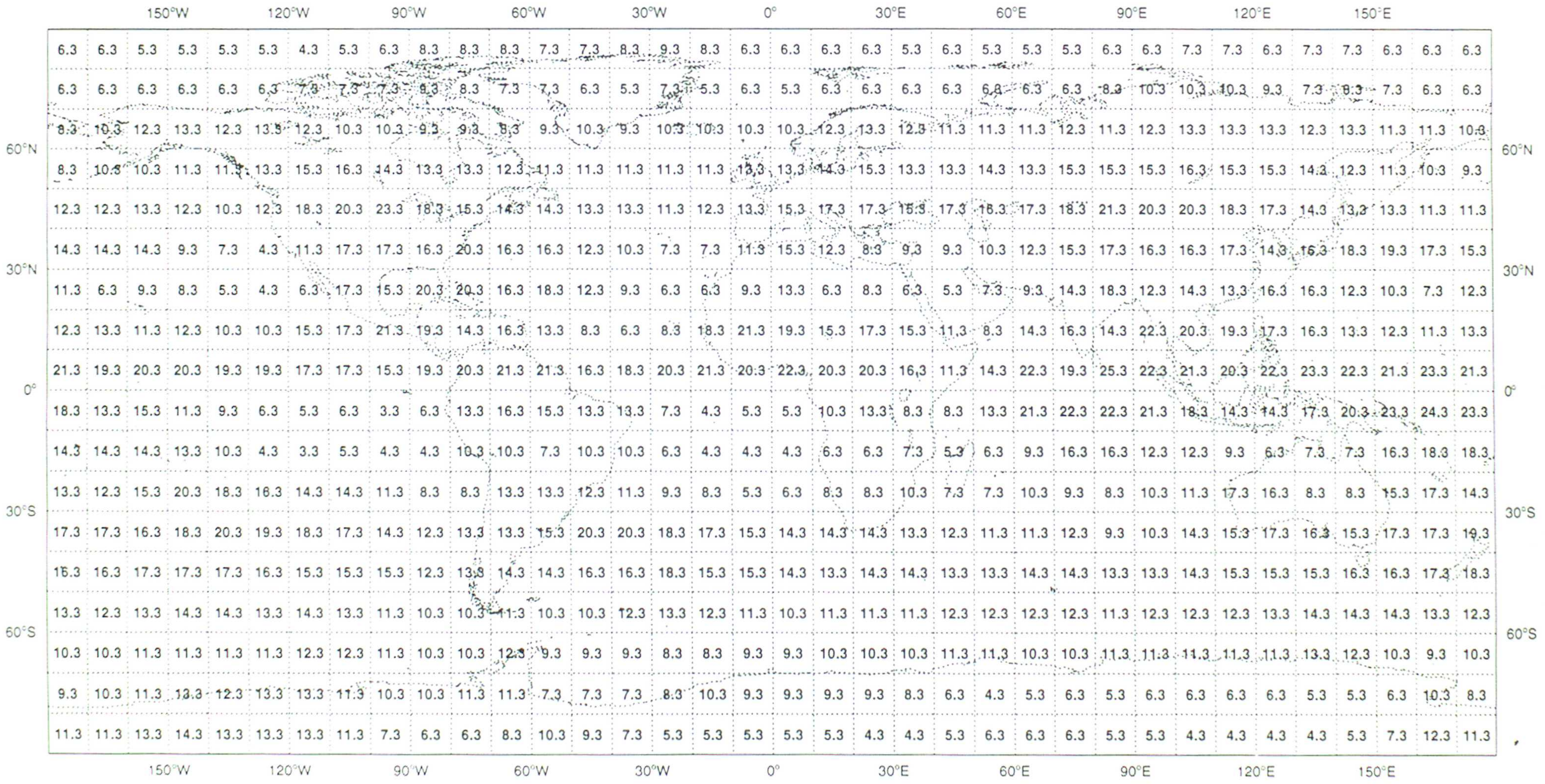
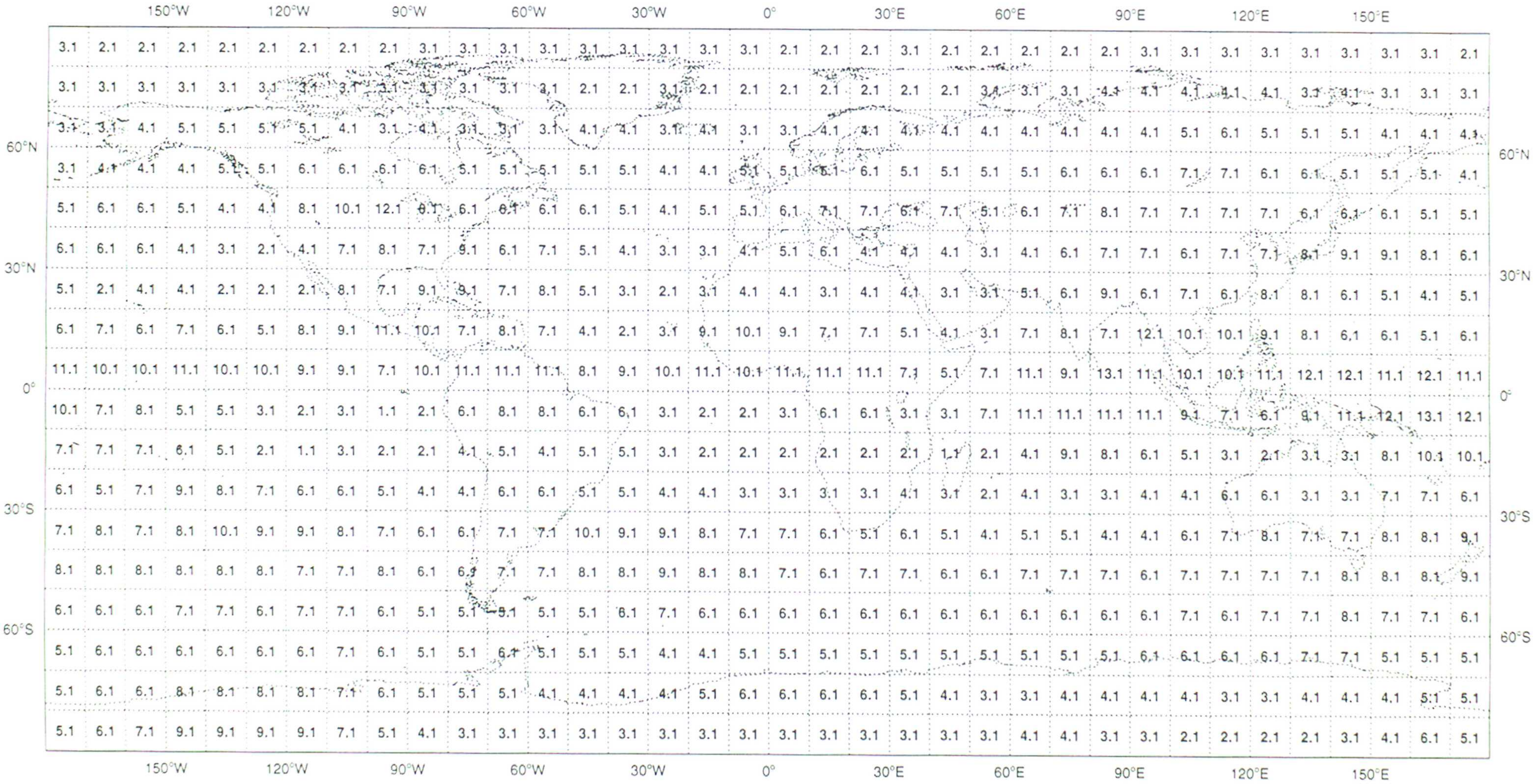

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
.4 .4 .4 .4 1.4 1.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 1.4 .4 .4 1.4 1.4 1.4 1.4 1.4 .4 .4 .4
.4 .4 .4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 .4
1.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 3.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4
1.4 1.4 1.4 1.4 1.4 .4 1.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 .4 .4 1.4 1.4 1.4 .4 1.4 .4 .4 .4 1.4 1.4 1.4 1.4 2.4 2.4 2.4 2.4 2.4 2.4 1.4
1.4 .4 1.4 1.4 .4 .4 .4 2.4 2.4 2.4 3.4 2.4 2.4 1.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 1.4 2.4 3.4 2.4 2.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4
2.4 2.4 1.4 2.4 2.4 1.4 2.4 3.4 3.4 3.4 2.4 2.4 2.4 1.4 .4 1.4 3.4 3.4 2.4 2.4 2.4 1.4 1.4 1.4 2.4 3.4 3.4 4.4 4.4 4.4 3.4 2.4 2.4 2.4 1.4 2.4
3.4 3.4 3.4 3.4 3.4 3.4 2.4 3.4 2.4 3.4 4.4 3.4 3.4 2.4 3.4 3.4 3.4 3.4 3.4 3.4 3.4 2.4 1.4 2.4 3.4 3.4 4.4 4.4 3.4 3.4 4.4 4.4 4.4 4.4 4.4 4.4
3.4 2.4 2.4 1.4 1.4 1.4 .4 1.4 .4 .4 1.4 2.4 2.4 2.4 1.4 1.4 .4 .4 .4 1.4 2.4 1.4 1.4 2.4 3.4 3.4 4.4 4.4 3.4 2.4 2.4 3.4 3.4 4.4 4.4 4.4
2.4 2.4 2.4 1.4 1.4 .4 .4 1.4 .4 .4 1.4 1.4 1.4 1.4 1.4 1.4 .4 .4 .4 .4 .4 .4 .4 1.4 1.4 3.4 3.4 2.4 1.4 1.4 .4 1.4 1.4 3.4 3.4 3.4
1.4 1.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 2.4 2.4 1.4 1.4 1.4 .4 .4 .4 .4 1.4 .4 .4 .4 .4 1.4 1.4 1.4 1.4 1.4 .4 .4 2.4 2.4 1.4
2.4 2.4 1.4 2.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 1.4 2.4 2.4 2.4 2.4 1.4 2.4 1.4 1.4 1.4 1.4 .4 1.4 1.4 .4 1.4 1.4 1.4 1.4 1.4 2.4 2.4 1.4 2.4
2.4 2.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 2.4 1.4 2.4
1.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4
1.4 1.4 1.4 1.4 1.4 1.4 1.4 2.4 1.4 1.4 2.4 1.4 1.4 1.4 1.4 1.4 .4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 1.4
1.4 1.4 1.4 2.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4 1.4 1.4 1.4 .4 .4 1.4 1.4 1.4 1.4 1.4 1.4 1.4 .4 .4 1.4 1.4 1.4 1.4 .4 .4 1.4 1.4 1.4 1.4 1.4
1.4 1.4 2.4 2.4 2.4 2.4 2.4 2.4 1.4 1.4 1.4 .4 .4 .4 .4 .4 .4 1.4 1.4 1.4 1.4 1.4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



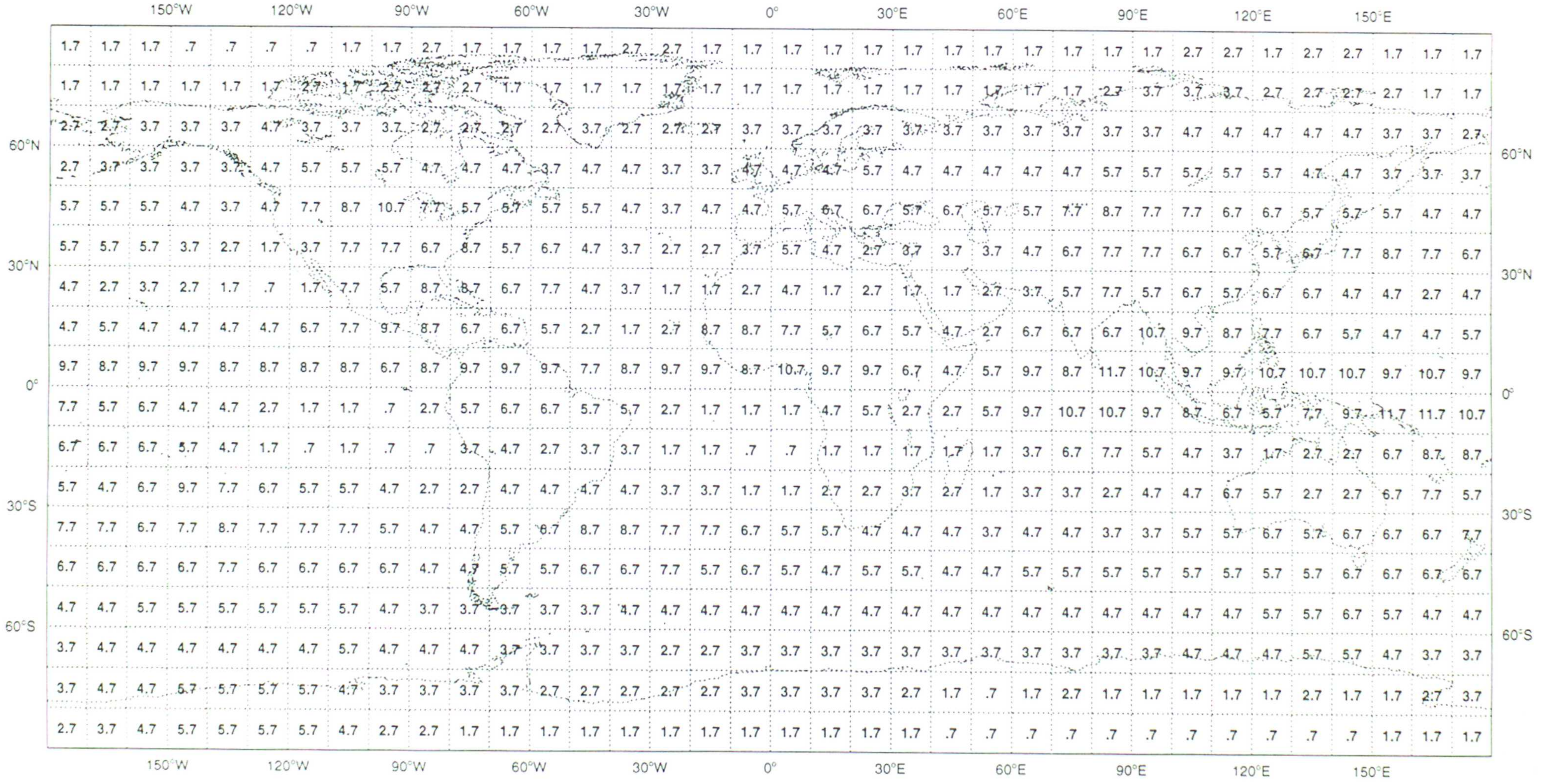
6.3	6.3	5.3	5.3	5.3	5.3	4.3	5.3	6.3	8.3	8.3	8.3	7.3	7.3	8.3	9.3	8.3	6.3	6.3	6.3	6.3	5.3	6.3	5.3	5.3	5.3	6.3	6.3	7.3	7.3	6.3	7.3	7.3	6.3	6.3	6.3
6.3	6.3	6.3	6.3	6.3	6.3	7.3	7.3	7.3	8.3	8.3	7.3	7.3	6.3	5.3	7.3	5.3	6.3	5.3	6.3	6.3	6.3	6.3	6.3	6.3	6.3	8.3	10.3	10.3	10.3	9.3	7.3	8.3	7.3	6.3	6.3
8.3	10.3	12.3	13.3	12.3	13.3	12.3	10.3	10.3	9.3	9.3	8.3	9.3	10.3	9.3	10.3	10.3	10.3	10.3	12.3	13.3	12.3	11.3	11.3	11.3	12.3	11.3	12.3	13.3	13.3	13.3	12.3	13.3	11.3	11.3	10.3
8.3	10.3	10.3	11.3	11.3	13.3	15.3	16.3	14.3	13.3	13.3	12.3	11.3	11.3	11.3	11.3	11.3	13.3	13.3	14.3	15.3	13.3	13.3	14.3	13.3	15.3	15.3	15.3	16.3	15.3	15.3	14.3	12.3	11.3	10.3	9.3
12.3	12.3	13.3	12.3	10.3	12.3	18.3	20.3	23.3	18.3	15.3	14.3	14.3	13.3	13.3	11.3	12.3	13.3	15.3	17.3	17.3	15.3	17.3	16.3	17.3	18.3	21.3	20.3	20.3	18.3	17.3	14.3	13.3	13.3	11.3	11.3
14.3	14.3	14.3	9.3	7.3	4.3	11.3	17.3	17.3	16.3	20.3	16.3	16.3	12.3	10.3	7.3	7.3	11.3	15.3	12.3	8.3	9.3	9.3	10.3	12.3	15.3	17.3	16.3	16.3	17.3	14.3	16.3	18.3	19.3	17.3	15.3
11.3	6.3	9.3	8.3	5.3	4.3	6.3	17.3	15.3	20.3	20.3	16.3	18.3	12.3	9.3	6.3	6.3	9.3	13.3	6.3	8.3	6.3	5.3	7.3	9.3	14.3	18.3	12.3	14.3	13.3	16.3	16.3	12.3	10.3	7.3	12.3
12.3	13.3	11.3	12.3	10.3	10.3	15.3	17.3	21.3	19.3	14.3	16.3	13.3	8.3	6.3	8.3	18.3	21.3	19.3	15.3	17.3	15.3	11.3	8.3	14.3	16.3	14.3	22.3	20.3	19.3	17.3	16.3	13.3	12.3	11.3	13.3
21.3	19.3	20.3	20.3	19.3	19.3	17.3	17.3	15.3	19.3	20.3	21.3	21.3	16.3	18.3	20.3	21.3	20.3	22.3	20.3	20.3	16.3	11.3	14.3	22.3	19.3	25.3	22.3	21.3	20.3	22.3	23.3	22.3	21.3	23.3	21.3
18.3	13.3	15.3	11.3	9.3	6.3	5.3	6.3	3.3	6.3	13.3	16.3	15.3	13.3	13.3	7.3	4.3	5.3	5.3	10.3	13.3	8.3	8.3	13.3	21.3	22.3	22.3	21.3	18.3	14.3	14.3	17.3	20.3	23.3	24.3	23.3
14.3	14.3	14.3	13.3	10.3	4.3	3.3	5.3	4.3	4.3	10.3	10.3	7.3	10.3	10.3	6.3	4.3	4.3	4.3	6.3	6.3	7.3	5.3	6.3	9.3	16.3	16.3	12.3	12.3	9.3	6.3	7.3	7.3	16.3	18.3	18.3
13.3	12.3	15.3	20.3	18.3	16.3	14.3	14.3	11.3	8.3	8.3	13.3	13.3	12.3	11.3	9.3	8.3	5.3	6.3	8.3	8.3	10.3	7.3	7.3	10.3	9.3	8.3	10.3	11.3	17.3	16.3	8.3	8.3	15.3	17.3	14.3
17.3	17.3	16.3	18.3	20.3	19.3	18.3	17.3	14.3	12.3	13.3	13.3	15.3	20.3	20.3	18.3	17.3	15.3	14.3	14.3	14.3	13.3	12.3	11.3	11.3	12.3	9.3	10.3	14.3	15.3	17.3	16.3	15.3	17.3	17.3	19.3
16.3	16.3	17.3	17.3	17.3	16.3	15.3	15.3	15.3	12.3	13.3	14.3	14.3	16.3	16.3	18.3	15.3	15.3	14.3	13.3	14.3	14.3	13.3	13.3	14.3	14.3	13.3	13.3	14.3	15.3	15.3	15.3	16.3	16.3	17.3	18.3
13.3	12.3	13.3	14.3	14.3	13.3	14.3	13.3	11.3	10.3	10.3	11.3	10.3	10.3	12.3	13.3	12.3	11.3	10.3	11.3	11.3	11.3	12.3	12.3	12.3	12.3	11.3	12.3	12.3	12.3	13.3	14.3	14.3	14.3	13.3	12.3
10.3	10.3	11.3	11.3	11.3	11.3	12.3	12.3	11.3	10.3	10.3	12.3	9.3	9.3	9.3	8.3	8.3	9.3	9.3	10.3	10.3	10.3	11.3	11.3	10.3	10.3	11.3	11.3	11.3	11.3	11.3	13.3	12.3	10.3	9.3	10.3
9.3	10.3	11.3	13.3	12.3	13.3	13.3	11.3	10.3	10.3	11.3	11.3	7.3	7.3	7.3	8.3	10.3	9.3	9.3	9.3	9.3	8.3	6.3	4.3	5.3	6.3	5.3	6.3	6.3	6.3	6.3	5.3	5.3	6.3	10.3	8.3
11.3	11.3	13.3	14.3	13.3	13.3	13.3	11.3	7.3	6.3	6.3	8.3	10.3	9.3	7.3	5.3	5.3	5.3	5.3	5.3	4.3	4.3	5.3	6.3	6.3	6.3	5.3	5.3	4.3	4.3	4.3	4.3	5.3	7.3	12.3	11.3

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



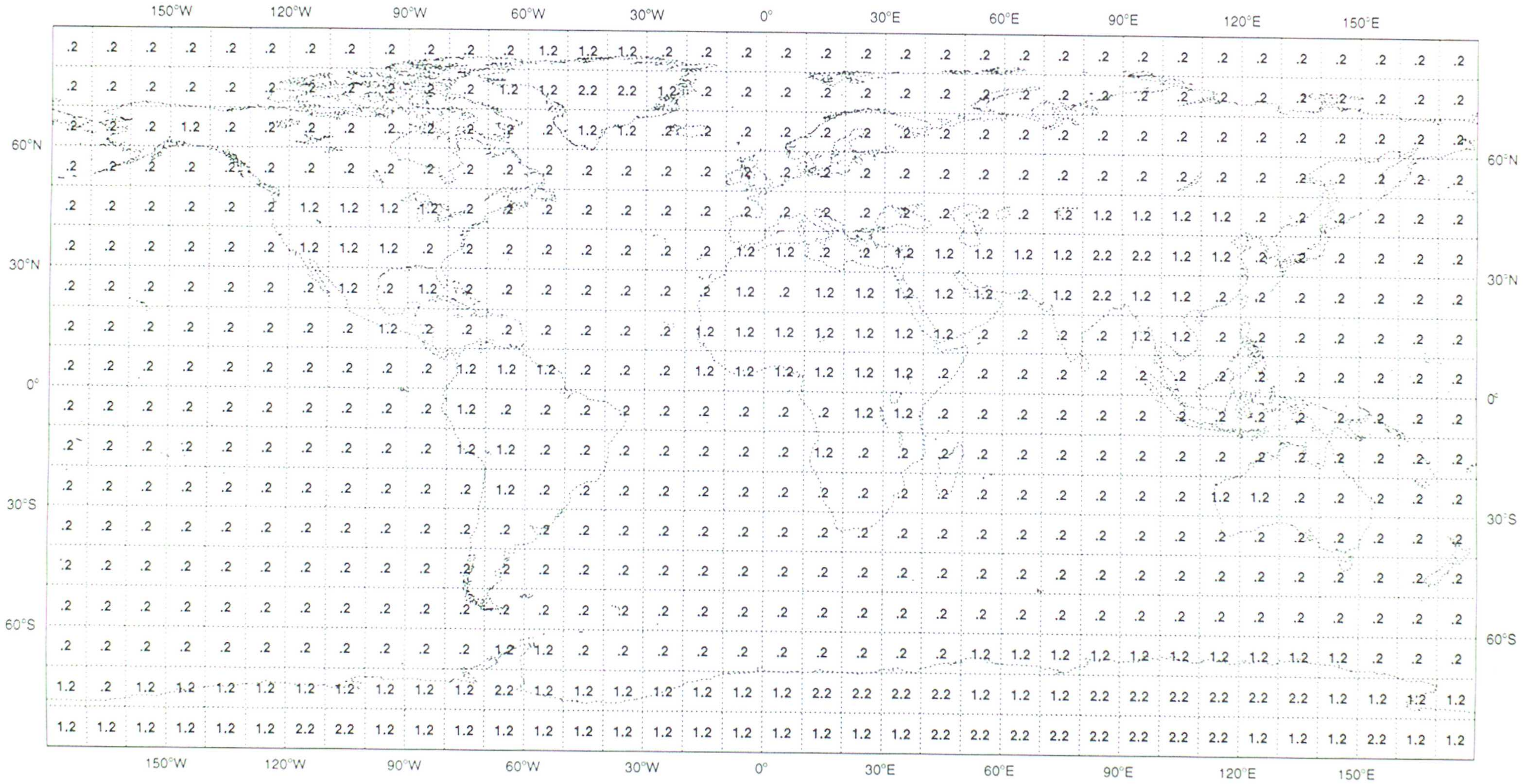
3.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	2.1	3.1	2.1	2.1	2.1	2.1	2.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.1
3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	2.1	2.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	3.1	3.1	3.1	4.1	4.1	4.1	4.1	4.1	3.1	4.1	3.1	3.1	3.1
3.1	3.1	4.1	5.1	5.1	5.1	5.1	4.1	3.1	4.1	3.1	3.1	3.1	4.1	4.1	3.1	4.1	3.1	3.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	5.1	6.1	5.1	5.1	5.1	4.1	4.1	4.1
3.1	4.1	4.1	4.1	5.1	5.1	6.1	6.1	6.1	6.1	5.1	5.1	5.1	5.1	5.1	4.1	4.1	5.1	5.1	5.1	6.1	5.1	5.1	5.1	5.1	6.1	6.1	6.1	7.1	7.1	6.1	6.1	5.1	5.1	5.1	4.1
5.1	6.1	6.1	5.1	4.1	4.1	8.1	10.1	12.1	8.1	6.1	6.1	6.1	6.1	5.1	4.1	5.1	5.1	6.1	7.1	7.1	6.1	7.1	5.1	6.1	7.1	8.1	7.1	7.1	7.1	7.1	6.1	6.1	6.1	5.1	5.1
6.1	6.1	6.1	4.1	3.1	2.1	4.1	7.1	8.1	7.1	9.1	6.1	7.1	5.1	4.1	3.1	3.1	4.1	5.1	6.1	4.1	4.1	4.1	3.1	4.1	6.1	7.1	7.1	6.1	7.1	7.1	8.1	9.1	9.1	8.1	6.1
5.1	2.1	4.1	4.1	2.1	2.1	2.1	8.1	7.1	9.1	9.1	7.1	8.1	5.1	3.1	2.1	3.1	4.1	4.1	3.1	4.1	4.1	3.1	3.1	5.1	6.1	9.1	6.1	7.1	6.1	8.1	8.1	6.1	5.1	4.1	5.1
6.1	7.1	6.1	7.1	6.1	5.1	8.1	9.1	11.1	10.1	7.1	8.1	7.1	4.1	2.1	3.1	9.1	10.1	9.1	7.1	7.1	5.1	4.1	3.1	7.1	8.1	7.1	12.1	10.1	10.1	9.1	8.1	6.1	6.1	5.1	6.1
11.1	10.1	10.1	11.1	10.1	10.1	9.1	9.1	7.1	10.1	11.1	11.1	11.1	8.1	9.1	10.1	11.1	10.1	11.1	11.1	11.1	7.1	5.1	7.1	11.1	9.1	13.1	11.1	10.1	10.1	11.1	12.1	12.1	11.1	12.1	11.1
10.1	7.1	8.1	5.1	5.1	3.1	2.1	3.1	1.1	2.1	6.1	8.1	8.1	6.1	6.1	3.1	2.1	2.1	3.1	6.1	6.1	3.1	3.1	7.1	11.1	11.1	11.1	11.1	9.1	7.1	6.1	9.1	11.1	12.1	13.1	12.1
7.1	7.1	7.1	6.1	5.1	2.1	1.1	3.1	2.1	2.1	4.1	5.1	4.1	5.1	5.1	3.1	2.1	2.1	2.1	2.1	2.1	2.1	1.1	2.1	4.1	9.1	8.1	6.1	5.1	3.1	2.1	3.1	3.1	8.1	10.1	10.1
6.1	5.1	7.1	9.1	8.1	7.1	6.1	6.1	5.1	4.1	4.1	6.1	6.1	5.1	5.1	4.1	4.1	3.1	3.1	3.1	3.1	4.1	3.1	2.1	4.1	3.1	3.1	4.1	4.1	6.1	6.1	3.1	3.1	7.1	7.1	6.1
7.1	8.1	7.1	8.1	10.1	9.1	9.1	8.1	7.1	6.1	6.1	7.1	7.1	10.1	9.1	9.1	8.1	7.1	7.1	6.1	5.1	6.1	5.1	4.1	5.1	5.1	4.1	4.1	6.1	7.1	8.1	7.1	7.1	8.1	8.1	9.1
8.1	8.1	8.1	8.1	8.1	8.1	7.1	7.1	8.1	6.1	6.1	7.1	7.1	8.1	8.1	9.1	8.1	8.1	7.1	6.1	7.1	7.1	6.1	6.1	7.1	7.1	7.1	6.1	7.1	7.1	7.1	7.1	8.1	8.1	8.1	9.1
6.1	6.1	6.1	7.1	7.1	6.1	7.1	7.1	6.1	5.1	5.1	5.1	5.1	5.1	6.1	7.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	7.1	6.1	7.1	7.1	8.1	7.1	7.1	6.1
5.1	6.1	6.1	6.1	6.1	6.1	6.1	7.1	6.1	5.1	5.1	6.1	5.1	5.1	5.1	4.1	4.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	6.1	6.1	6.1	6.1	7.1	7.1	5.1	5.1	5.1
5.1	6.1	6.1	8.1	8.1	8.1	8.1	7.1	6.1	5.1	5.1	5.1	4.1	4.1	4.1	4.1	5.1	6.1	6.1	6.1	6.1	5.1	4.1	3.1	3.1	4.1	4.1	4.1	4.1	3.1	3.1	4.1	4.1	4.1	5.1	5.1
5.1	6.1	7.1	9.1	9.1	9.1	9.1	7.1	5.1	4.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	4.1	4.1	3.1	3.1	2.1	2.1	2.1	2.1	3.1	4.1	6.1	5.1

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



1.7	1.7	1.7	.7	.7	.7	.7	1.7	1.7	2.7	1.7	1.7	1.7	1.7	2.7	2.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	2.7	2.7	1.7	2.7	2.7	1.7	1.7	1.7
1.7	1.7	1.7	1.7	1.7	1.7	2.7	1.7	2.7	2.7	2.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	2.7	3.7	3.7	3.7	2.7	2.7	2.7	2.7	1.7	1.7
2.7	2.7	3.7	3.7	3.7	4.7	3.7	3.7	3.7	2.7	2.7	2.7	2.7	3.7	2.7	2.7	2.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	4.7	4.7	4.7	4.7	4.7	3.7	3.7	2.7
2.7	3.7	3.7	3.7	3.7	4.7	5.7	5.7	5.7	4.7	4.7	4.7	3.7	4.7	4.7	3.7	3.7	4.7	4.7	4.7	5.7	4.7	4.7	4.7	4.7	4.7	5.7	5.7	5.7	5.7	5.7	4.7	4.7	3.7	3.7	3.7
5.7	5.7	5.7	4.7	3.7	4.7	7.7	8.7	10.7	7.7	5.7	5.7	5.7	5.7	4.7	3.7	4.7	4.7	5.7	6.7	6.7	5.7	6.7	5.7	5.7	7.7	8.7	7.7	7.7	6.7	6.7	5.7	5.7	5.7	4.7	4.7
5.7	5.7	5.7	3.7	2.7	1.7	3.7	7.7	7.7	6.7	8.7	5.7	6.7	4.7	3.7	2.7	2.7	3.7	5.7	4.7	2.7	3.7	3.7	3.7	4.7	6.7	7.7	7.7	6.7	6.7	5.7	6.7	7.7	8.7	7.7	6.7
4.7	2.7	3.7	2.7	1.7	.7	1.7	7.7	5.7	8.7	8.7	6.7	7.7	4.7	3.7	1.7	1.7	2.7	4.7	1.7	2.7	1.7	1.7	2.7	3.7	5.7	7.7	5.7	6.7	5.7	6.7	6.7	4.7	4.7	2.7	4.7
4.7	5.7	4.7	4.7	4.7	4.7	6.7	7.7	9.7	8.7	6.7	6.7	5.7	2.7	1.7	2.7	8.7	8.7	7.7	5.7	6.7	5.7	4.7	2.7	6.7	6.7	6.7	10.7	9.7	8.7	7.7	6.7	5.7	4.7	4.7	5.7
9.7	8.7	9.7	9.7	8.7	8.7	8.7	8.7	6.7	8.7	9.7	9.7	9.7	7.7	8.7	9.7	9.7	8.7	10.7	9.7	9.7	6.7	4.7	5.7	9.7	8.7	11.7	10.7	9.7	9.7	10.7	10.7	10.7	9.7	10.7	9.7
7.7	5.7	6.7	4.7	4.7	2.7	1.7	1.7	.7	2.7	5.7	6.7	6.7	5.7	5.7	2.7	1.7	1.7	1.7	4.7	5.7	2.7	2.7	5.7	9.7	10.7	10.7	9.7	8.7	6.7	5.7	7.7	9.7	11.7	11.7	10.7
6.7	6.7	6.7	5.7	4.7	1.7	.7	1.7	.7	.7	3.7	4.7	2.7	3.7	3.7	1.7	1.7	.7	.7	1.7	1.7	1.7	1.7	1.7	3.7	6.7	7.7	5.7	4.7	3.7	1.7	2.7	2.7	6.7	8.7	8.7
5.7	4.7	6.7	9.7	7.7	6.7	5.7	5.7	4.7	2.7	2.7	4.7	4.7	4.7	4.7	3.7	3.7	1.7	1.7	2.7	2.7	3.7	2.7	1.7	3.7	3.7	2.7	4.7	4.7	6.7	5.7	2.7	2.7	6.7	7.7	5.7
7.7	7.7	6.7	7.7	8.7	7.7	7.7	7.7	5.7	4.7	4.7	5.7	6.7	8.7	8.7	7.7	7.7	6.7	5.7	5.7	4.7	4.7	4.7	3.7	4.7	4.7	3.7	3.7	5.7	5.7	6.7	5.7	6.7	6.7	6.7	7.7
6.7	6.7	6.7	6.7	7.7	6.7	6.7	6.7	6.7	4.7	4.7	5.7	5.7	6.7	6.7	7.7	5.7	6.7	5.7	4.7	5.7	5.7	4.7	4.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	5.7	6.7	6.7	6.7	6.7
4.7	4.7	5.7	5.7	5.7	5.7	5.7	5.7	4.7	3.7	3.7	3.7	3.7	3.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	4.7	5.7	5.7	6.7	5.7	4.7	4.7
3.7	4.7	4.7	4.7	4.7	4.7	4.7	5.7	4.7	4.7	4.7	3.7	3.7	3.7	3.7	2.7	2.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	4.7	4.7	4.7	5.7	5.7	4.7	3.7	3.7
3.7	4.7	4.7	5.7	5.7	5.7	5.7	4.7	3.7	3.7	3.7	3.7	2.7	2.7	2.7	2.7	2.7	3.7	3.7	3.7	3.7	2.7	1.7	.7	1.7	2.7	1.7	1.7	1.7	1.7	1.7	2.7	1.7	1.7	2.7	3.7
2.7	3.7	4.7	5.7	5.7	5.7	5.7	4.7	2.7	2.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	.7	1.7	1.7	1.7

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	2.2	2.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	1.2	1.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	1.2	1.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	1.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	1.2	.2	1.2	1.2	1.2	1.2	1.2	.2	1.2	2.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	.2	.2	.2	1.2	1.2	1.2	1.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2
.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	.2	.2	.2
1.2	.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	2.2	2.2	1.2	1.2	1.2	2.2	2.2	2.2	2.2	2.2	2.2	1.2	1.2	1.2	1.2
1.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	1.2	1.2	1.2	2.2	1.2	1.2

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

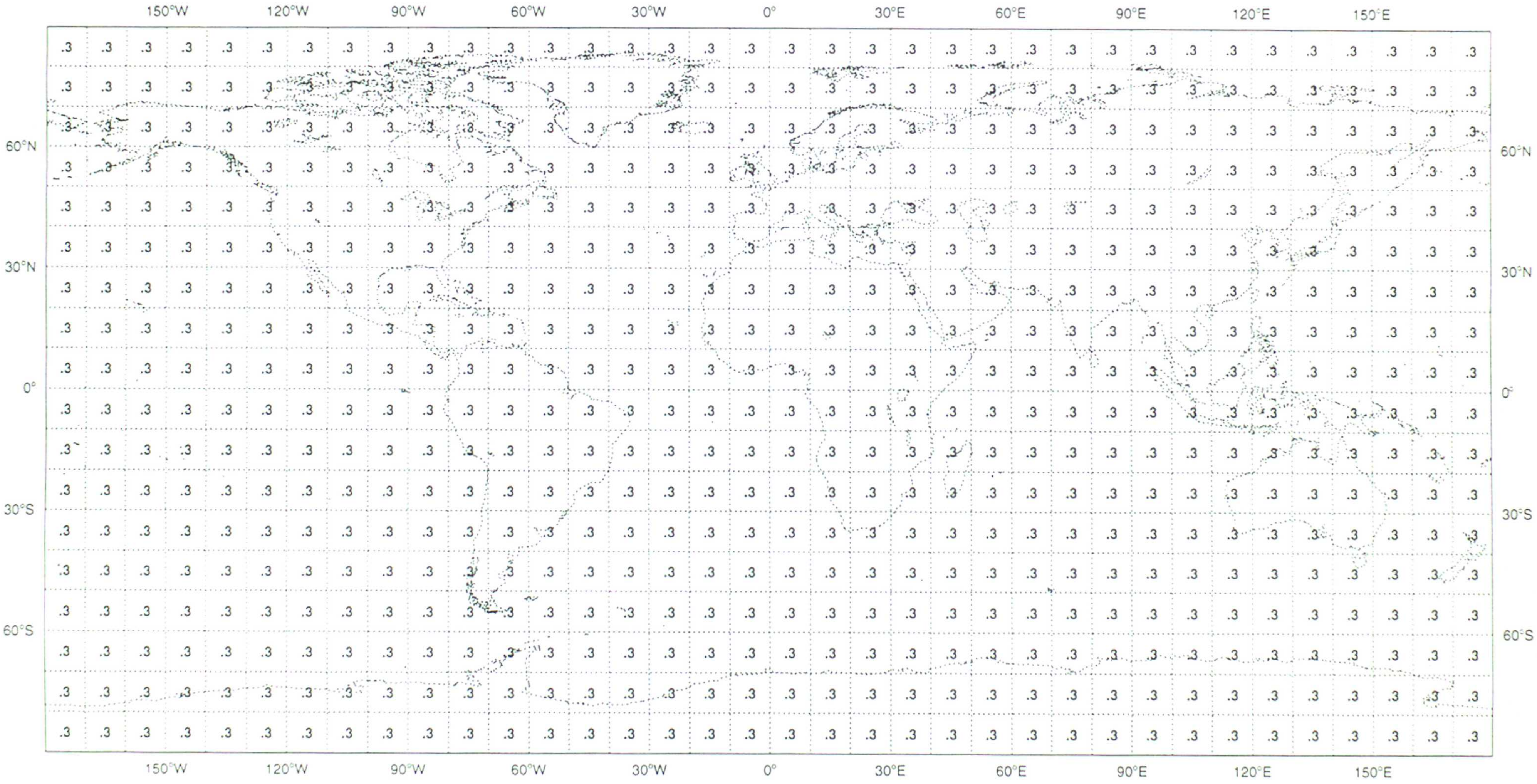

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.3

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). JUNE 2002
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

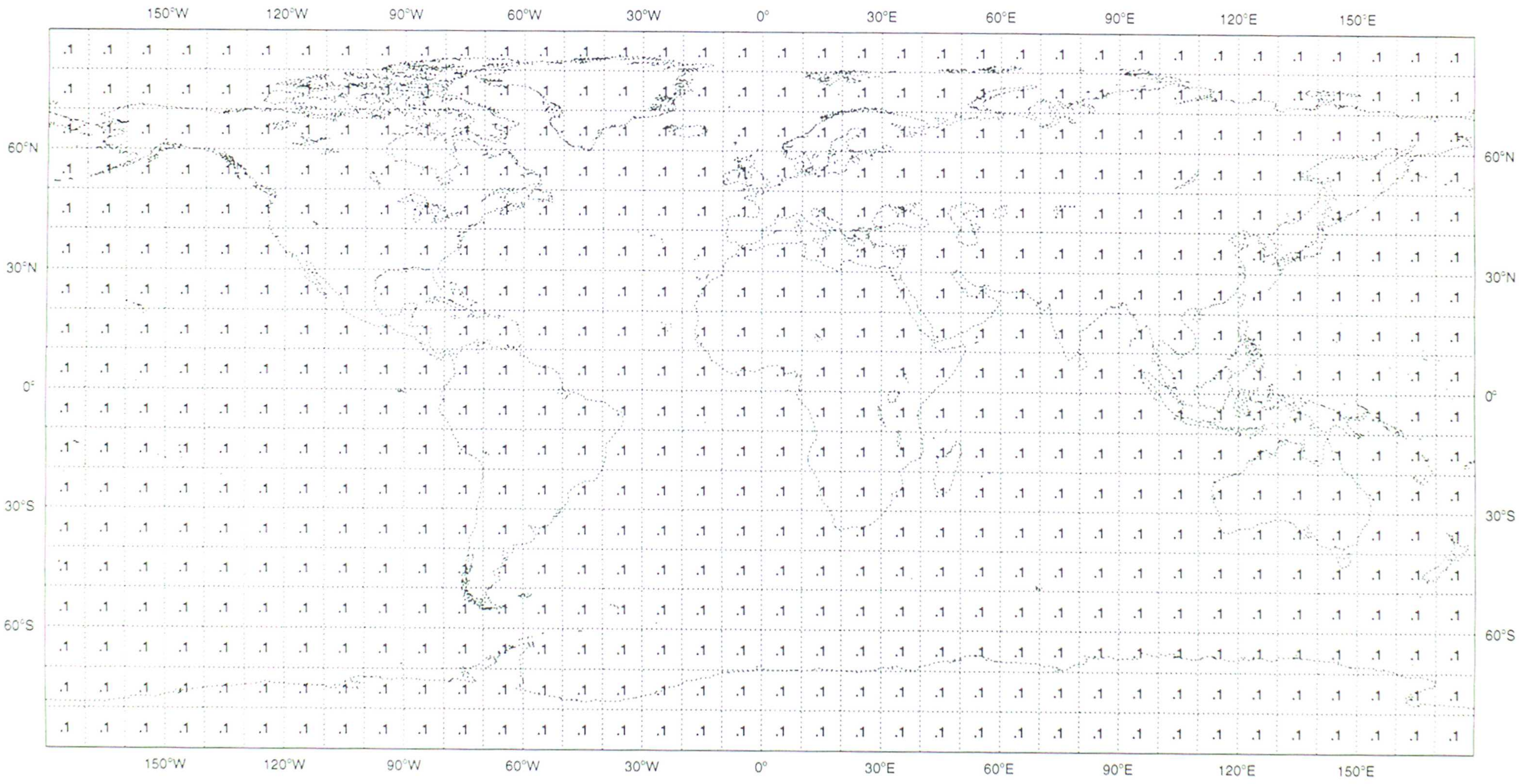

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.1

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for drifting buoy.
Area monitored		:10°N - 80°N, 85°W - 0°W
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:All hours combined.
Elements monitored		:Mean sea-level pressure (hPa) :Wind speed ($m\ s^{-1}$) :Wind direction (degrees)
Parameters monitored		
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. A positive bias indicates the wind observation is veered to the background**
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors
GROSS ERROR LIMITS	:15 hPa (pressure) :25 $m\ s^{-1}$ (Vector Wind)	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 $m\ s^{-1}$

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
13503	23.2	-28.4	P	114	0	2	0.5	0.4	0.6
24500	44.3	-82.4	P	1	0	0	0.0	0.1	0.1
24880	53.5	-31.2	P	1	0	0	0.0	-0.8	0.8
25552	69.6	-21.9	P	198	14	94	3.2	8.4	9.0
41501	20.4	-53.7	P	151	0	24	2.4	-0.2	2.4
41503	19.3	-40.8	P	600	0	1	0.5	-0.4	0.7
41522	16.9	-41.3	P	587	0	1	0.5	0.1	0.5
41523	28.4	-44.1	P	419	0	41	0.4	0.3	0.5
41528	10.8	-54.9	P	89	0	0	0.6	-0.2	0.6
41552	23.2	-55.2	P	1	100	100			
41553	21.5	-52.2	P	1	0	0	0.0	-0.5	0.5
41556	20.0	-81.6	P	644	0	1	0.5	-0.7	0.9
41559	23.2	-71.1	P	618	0	0	0.5	-0.5	0.7
41561	19.9	-56.0	P	605	0	1	0.4	-0.7	0.8
41563	21.7	-52.2	P	645	0	1	0.5	-0.6	0.8
41577	36.4	-75.3	P	1479	0	61	0.6	0.1	0.6
41579	39.8	-70.1	P	1451	0	62	0.6	1.0	1.2
41580	40.0	-72.1	P	780	0	66	0.7	0.0	0.7
41583	20.1	-40.5	P	1	0	0	0.0	-0.8	0.8
41625	25.4	-52.1	P	175	0	1	0.4	0.3	0.5
41630	33.9	-76.8	P	1249	0	58	0.6	0.5	0.7
41640	29.3	-80.5	P	1113	2	58	1.5	1.6	2.2
41641	29.7	-80.9	P	1465	1	62	0.9	0.8	1.2
41643	31.5	-80.2	P	1470	0	61	0.7	0.3	0.7
41645	29.6	-78.0	P	598	0	0	0.7	0.3	0.7
41647	30.3	-72.3	P	612	0	1	0.5	0.1	0.5
41648	24.7	-70.5	P	622	0	5	0.5	0.4	0.6
41649	10.8	-42.8	P	591	0	0	0.6	-0.4	0.7
41650	29.2	-66.4	P	642	0	2	0.5	0.5	0.7
41652	24.9	-68.5	P	612	0	1	0.5	0.3	0.6
41655	33.6	-31.4	P	1	0	0	0.0	-0.4	0.4
41656	32.1	-80.8	P	892	0	32	0.7	0.3	0.7
41657	40.9	-35.4	P	138	1	1	0.7	-0.8	1.1
41658	35.2	-47.3	P	642	0	2	0.5	-0.6	0.8
41659	34.6	-32.5	P	651	0	1	0.6	0.5	0.7
41665	36.1	-72.7	P	1459	0	79	2.6	3.2	4.1
41666	38.1	-68.2	P	1557	0	62	0.7	0.0	0.7
42533	40.9	-58.5	P	788	0	23	0.7	-1.0	1.2
44504	45.1	-43.4	P	406	0	8	1.2	-0.3	1.2
44507	43.5	-70.1	P	1	0	0	0.0	-0.9	0.9
44517	41.2	-55.7	P	396	0	99	0.6	-0.2	0.7
44549	55.2	-26.0	P	1292	0	48	0.9	-0.5	1.0
44550	54.9	-21.5	P	1231	0	45	0.8	-0.4	0.9
44601	42.7	-45.3	P	615	0	3	0.6	-0.3	0.7
44602	43.9	-55.6	P	631	0	3	0.8	-0.4	0.9
44612	25.8	-42.1	P	125	0	6	0.6	-0.3	0.6
44616	40.7	-18.5	P	687	0	4	0.6	-0.3	0.7
44621	59.2	-44.7	P	1478	0	53	0.9	0.1	0.9
44624	41.9	-21.0	P	735	0	10	0.6	0.2	0.6
44625	39.4	-19.3	P	1155	0	42	0.5	0.0	0.5
44627	42.9	-27.1	P	588	0	2	0.8	-0.6	1.0
44720	51.8	-28.6	P	1	0	0	0.0	-0.6	0.6
44721	29.1	-36.9	P	1191	0	43	0.5	-0.1	0.6
44723	45.1	-32.4	P	692	0	3	1.0	0.1	1.0
44726	59.1	-43.1	P	1507	0	53	0.9	-0.1	0.9
44728	51.4	-26.6	P	1276	0	47	0.7	-0.8	1.0
44730	58.9	-24.7	P	1378	0	50	1.0	-0.2	1.0
44742	59.6	-16.0	P	1358	0	50	0.8	-0.3	0.8
44743	60.9	-24.5	P	1200	0	65	0.8	-0.4	0.9
44745	59.7	-15.6	P	1	0	0	0.0	-0.7	0.7

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
44763	45.3	-32.2	P	699	0	3	0.8	-0.2	0.8
44764	52.2	-36.1	P	689	0	3	0.7	-0.6	0.9
44767	52.1	-39.2	P	830	0	30	0.9	-0.1	0.9
44768	47.3	-48.7	P	63	0	3	0.6	0.1	0.6
44769	56.0	-41.7	P	702	0	4	0.9	-0.5	1.0
44770	52.9	-44.8	P	664	0	3	0.7	-0.6	1.0
44772	56.6	-36.9	P	667	0	4	0.9	-0.3	0.9
44773	45.4	-39.7	P	676	0	3	0.9	0.2	0.9
44775	28.3	-40.4	P	726	0	3	0.4	-0.6	0.7
44778	48.7	-5.2	P	977	0	34	0.6	-0.3	0.7
44779	55.3	-14.3	P	329	0	33	0.9	-0.5	1.0
44780	53.4	-33.1	P	487	0	36	0.8	-0.3	0.8
44801	41.1	-66.6	P	1	0	0	0.0	0.2	0.2
44805	43.2	-69.2	P	1	0	0	0.0	-0.7	0.7
44807	43.5	-70.1	P	2	0	0	0.6	-0.3	0.7
44811	41.7	-66.6	P	1	0	0	0.0	-0.3	0.3
45738	49.5	-65.8	P	2	0	0	0.2	-0.4	0.4
45805	41.7	-82.4	P	1	0	0	0.0	0.1	0.1
45808	44.3	-82.4	P	2	0	0	0.8	0.4	1.0
45838	49.5	-65.8	P	1	0	0	0.0	-1.8	1.8
46627	42.8	-27.4	P	2	0	0	0.1	-0.4	0.5
47556	60.6	-66.0	P	91	26	35	1.7	0.7	1.8
52507	50.8	-17.9	P	1	0	0	0.0	-0.7	0.7
54730	59.2	-25.2	P	1	0	0	0.0	0.1	0.1
62501	32.0	-32.3	P	701	0	3	0.5	0.3	0.6
62503	27.0	-29.4	P	1202	0	42	0.5	-0.7	0.9
62504	36.5	-17.5	P	835	0	24	0.5	0.0	0.5
62505	55.9	-31.9	P	316	0	5	0.7	-0.3	0.8
62507	50.8	-17.4	P	370	0	3	0.8	-0.5	1.0
62509	53.6	-25.1	P	322	0	6	1.1	0.4	1.2
62512	40.1	-15.5	P	1143	0	43	0.8	-0.9	1.2
62522	39.9	-15.6	P	1	0	0	0.0	-1.0	1.0
62601	50.6	-2.7	P	1	0	0	0.0	-0.9	0.9
62603	49.9	-2.9	P	2	0	0	0.1	0.3	0.3
62694	57.3	-23.0	P	765	22	51	0.7	-0.1	0.7
62696	53.5	-18.5	P	1133	0	42	1.2	-0.4	1.2
62697	51.0	-14.0	P	1057	0	37	0.8	-0.4	0.8
62701	50.6	-2.7	P	2	0	0	0.0	0.0	0.1
62706	57.0	-54.7	P	2	0	50	1.8	-3.9	4.3
62708	53.5	-19.5	P	1	0	0	0.0	-1.0	1.0
62711	60.4	-34.4	P	717	0	13	0.7	0.0	0.7
62788	53.4	-19.3	P	1	0	0	0.0	-1.0	1.0
62803	49.9	-2.9	P	1	0	0	0.0	-0.5	0.5
62807	50.0	-6.1	P	1	0	0	0.0	0.2	0.2
62823	51.4	-7.9	P	1	0	0	0.0	-0.9	0.9
62829	48.5	-12.4	P	1	0	0	0.0	-0.6	0.6
63662	70.2	-20.7	P	254	2	5	1.1	0.1	1.1
63663	65.3	-36.8	P	1	0	100	0.0	7.4	7.4
64549	57.7	-14.7	P	863	2	64	2.3	-0.7	2.4
64553	56.9	-29.3	P	711	0	45	0.6	-0.5	0.8
64845	59.1	-11.4	P	1	0	0	0.0	-0.1	0.1
WIND SPEED									
41501	20.4	-53.7	SPEED	1	0	100	0.0	10.0	10.0
41503	19.3	-40.8	SPEED	600	0	100	1.2	-0.8	1.4
41522	16.9	-41.3	SPEED	584	0	100	1.2	0.0	1.2
41552	23.2	-55.2	SPEED	1	100	0			
41553	21.5	-52.2	SPEED	1	0	100	0.0	0.8	0.8

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
WIND SPEED									
41556	20.0	-81.6	SPEED	635	1	100	2.5	1.0	2.7
41559	23.2	-71.1	SPEED	612	0	100	1.8	0.9	2.0
41561	19.9	-56.0	SPEED	600	0	100	1.4	0.4	1.4
41563	21.7	-52.2	SPEED	642	0	100	1.3	-0.1	1.3
41583	20.1	-40.5	SPEED	1	0	100	0.0	-2.0	2.0
41645	29.6	-78.0	SPEED	596	0	100	2.2	-3.3	3.9
41647	30.3	-72.3	SPEED	606	0	100	2.0	0.4	2.1
41648	24.7	-70.5	SPEED	620	0	100	1.7	0.4	1.7
41649	10.8	-42.8	SPEED	589	0	100	1.4	-0.1	1.4
41652	24.9	-68.5	SPEED	609	0	100	2.2	0.3	2.2
44601	42.7	-45.3	SPEED	609	0	100	2.5	2.4	3.5
44602	43.9	-55.6	SPEED	618	0	100	2.4	1.4	2.7
44801	41.1	-66.6	SPEED	1	0	100	0.0	-4.3	4.3
44805	43.2	-69.2	SPEED	1	0	100	0.0	-2.0	2.0
44811	41.7	-66.6	SPEED	1	0	100	0.0	1.1	1.1
45738	49.5	-65.8	SPEED	2	0	100	1.0	3.0	3.1
45838	49.5	-65.8	SPEED	1	0	100	0.0	-0.4	0.4
62603	49.9	-2.9	SPEED	2	0	100	0.1	1.1	1.1
62705	55.0	-12.7	SPEED	1	0	100	0.0	-3.7	3.7
62711	60.4	-34.4	SPEED	712	0	100	1.5	0.8	1.7
62803	49.9	-2.9	SPEED	1	0	100	0.0	1.0	1.0
62807	50.0	-6.1	SPEED	1	0	100	0.0	0.7	0.7
62823	51.4	-7.9	SPEED	1	0	100	0.0	3.3	3.3
62829	48.5	-12.4	SPEED	1	0	100	0.0	2.6	2.6
64845	59.1	-11.4	SPEED	1	0	100	0.0	-2.2	2.2
WIND DIRECTION									
41501	20.4	-53.7	DIRN.	1	0	0	0.0	77.1	77.1
41503	19.3	-40.8	DIRN.	525	0	0	11.1	15.5	19.1
41522	16.9	-41.3	DIRN.	580	0	0	9.1	-3.6	9.8
41552	23.2	-55.2	DIRN.	1	100	0			
41553	21.5	-52.2	DIRN.	1	0	0	0.0	-5.4	5.4
41556	20.0	-81.6	DIRN.	335	1	0	21.5	8.7	23.2
41559	23.2	-71.1	DIRN.	439	0	0	20.8	12.4	24.2
41561	19.9	-56.0	DIRN.	549	0	0	25.7	8.9	27.2
41563	21.7	-52.2	DIRN.	611	0	0	19.0	6.1	20.0
41583	20.1	-40.5	DIRN.	1	0	0	0.0	22.1	22.1
41645	29.6	-78.0	DIRN.	1	0	0	0.0	6.2	6.2
41647	30.3	-72.3	DIRN.	264	0	0	20.2	-2.1	20.3
41648	24.7	-70.5	DIRN.	445	0	0	18.7	30.5	35.8
41649	10.8	-42.8	DIRN.	579	0	0	10.1	-9.9	14.1
41652	24.9	-68.5	DIRN.	434	1	0	23.5	-9.6	25.4
44601	42.7	-45.3	DIRN.	492	0	0	16.9	5.7	17.8
44602	43.9	-55.6	DIRN.	391	0	0	16.1	-2.4	16.3
44801	41.1	-66.6	DIRN.	1	0	0	0.0	-8.4	8.4
44805	43.2	-69.2	DIRN.	1	0	0	0.0	-10.3	10.3
45738	49.5	-65.8	DIRN.	2	0	0	6.5	5.1	8.2
62603	49.9	-2.9	DIRN.	2	0	0	10.5	-28.6	30.5
62711	60.4	-34.4	DIRN.	532	0	0	16.5	-1.1	16.6
62803	49.9	-2.9	DIRN.	1	0	0	0.0	1.3	1.3
62807	50.0	-6.1	DIRN.	1	0	0	0.0	3.4	3.4
62823	51.4	-7.9	DIRN.	1	0	0	0.0	6.0	6.0
62829	48.5	-12.4	DIRN.	1	0	0	0.0	-9.9	9.9
64845	59.1	-11.4	DIRN.	1	0	0	0.0	-7.2	7.2

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	1112	1	6	1.7	0.2	984	0	6	0	7.6	0.5
ACA	1608	0	2	1.6	-0.2	1468	0	2	0	6.3	1.0
AEA	155	0	3	1.2	0.2	47	0	6	0	7.5	-0.5
AEL	145	0	12	1.7	-1.0	117	0	14	0	6.0	0.6
AFL	467	0	5	2.2	0.6	412	0	6	0	8.6	0.8
AFR	773	1	8	1.5	0.4	642	0	10	0	8.3	0.4
AIS	90	2	12	1.6	0.5	82	0	15	0	9.6	0.2
AJM	299	0	5	1.4	-0.3	243	0	5	0	6.9	1.2
AMM	90	0	10	1.5	0.3	70	0	11	0	6.9	0.4
AMX	223	2	4	1.4	0.2	157	0	7	0	10.5	-0.4
AZA	289	1	7	1.6	0.2	248	0	6	0	6.1	1.1
BAL	110	1	11	1.0	0.2	97	0	12	0	9.3	0.4
BAW	678	0	6	1.7	-0.6	655	0	7	0	6.3	0.4
BSK	28	4	14	2.2	0.3	26	0	23	0	13.7	4.6
BWA	62	2	10	1.4	0.8	33	3	15	0	9.1	0.7
CFG	348	1	2	1.6	-0.5	297	0	2	0	7.2	0.0
CGB	24	4	4	1.3	-0.5	26	0	0	0	6.0	1.5
CGH	32	0	0	1.0	0.4	32	0	0	0	3.7	-0.2
CLX	323	0	4	1.6	-0.3	296	0	4	0	6.6	0.4
COA	134	0	21	1.7	0.0	96	0	24	0	10.1	0.3
CRL	319	1	3	1.5	0.1	240	0	5	0	8.9	0.6
CUB	142	1	4	1.3	0.2	113	0	8	0	7.0	0.3
DAB	40	0	3	1.4	-0.1	38	0	3	0	4.1	1.2
DAI	43	0	0	1.3	0.5	37	0	0	0	3.8	0.0
DAL	895	0	14	1.5	-0.5	788	0	16	0	7.9	0.2
DBR	40	0	0	1.4	-0.7	40	0	0	0	5.8	-0.3
DCE	70	0	11	1.1	0.1	61	0	16	0	7.6	0.3
DHL	37	0	86	6.5	-6.4	35	0	14	0	9.6	3.4
DLH	900	1	11	1.5	0.1	869	0	12	0	6.9	1.0
EDW	43	0	7	1.4	-0.3	42	0	2	0	5.3	0.9
EIA	153	0	10	1.5	-0.1	136	0	100	0	20.1	6.9
ELY	129	0	2	1.4	0.0	130	0	2	0	5.6	1.0
ETH	44	0	9	0.8	0.2	49	0	10	0	5.8	-0.9
EWW	103	0	1	1.5	0.1	102	0	3	0	9.5	1.5
FDX	801	0	29	1.3	0.2	803	0	31	0	8.0	1.2
FIN	292	0	3	1.8	0.4	273	0	3	0	6.2	0.6
GAF	74	1	3	1.9	-0.6	75	0	1	0	7.2	0.8
GCO	144	0	6	1.6	0.1	147	0	100	0	13.7	4.4
GRL	35	0	0	1.0	0.3	27	0	0	0	5.0	0.8
GTI	148	0	6	2.0	-0.7	146	0	8	0	7.5	1.5
IBE	954	1	7	1.5	0.4	552	1	12	0	7.5	0.3
ICE	852	0	2	1.5	-0.1	784	0	2	0	6.2	0.5
IWD	83	2	7	1.4	-0.3	33	0	6	0	6.0	2.0
KLM	954	1	3	1.6	0.1	794	0	3	0	6.5	0.7
LDA	27	0	15	1.4	-0.6	23	0	22	0	10.8	0.9
LDI	228	0	5	2.1	0.4	167	1	6	0	8.8	-0.1
LIB	198	0	11	1.5	0.8	109	1	7	0	8.2	1.3
LOT	152	1	1	1.5	-1.0	141	1	2	0	6.7	1.5
LTU	522	0	4	1.5	0.1	435	0	5	0	6.0	0.6
MAS	32	0	3	1.2	0.4	31	0	0	0	5.1	1.2
MON	29	0	0	1.2	0.1	22	0	5	0	5.8	-0.4
MPD	144	1	6	1.4	-0.5	79	0	6	0	7.4	1.2
MPH	401	0	1	1.5	-0.5	379	0	3	0	8.2	-0.3
MYT	212	0	5	1.4	-0.1	192	0	6	0	6.0	0.6
NCA	35	0	3	1.5	0.4	32	0	3	0	5.2	0.0
NWA	3621	0	3	1.6	0.4	3611	0	4	0	6.8	0.7
PAC	133	1	6	1.8	0.3	132	0	7	0	9.1	0.8
RAM	216	1	4	1.5	0.1	131	1	3	0	5.5	0.0
RCH	185	1	100	2.0	0.2	169	1	100	0	10.5	2.3

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
RJA	30	0	0	1.5	-0.6	31	0	6	0	7.6	1.0
RRR	84	0	5	1.6	-0.3	77	0	9	0	7.8	1.1
RZO	111	0	49	2.9	1.9	89	0	2	0	6.5	0.9
SLR	138	0	11	1.4	0.0	136	1	13	0	6.3	0.6
SSV	55	0	4	1.4	0.2	52	0	4	0	6.4	0.4
SVA	28	0	4	1.3	0.0	30	0	3	0	5.2	1.1
TAG	31	0	6	3.0	0.3	29	0	10	0	15.0	-0.2
TAP	289	1	6	1.4	-0.5	143	0	10	0	8.4	0.9
THT	25	0	0	1.3	-0.4	23	0	0	0	4.4	0.8
TPA	35	0	9	0.7	0.0	31	0	6	0	6.8	0.9
TSC	259	0	4	1.8	0.1	235	0	3	0	6.3	0.7
UAL	329	0	74	1.9	-0.9	346	0	74	0	7.9	0.6
UPS	1032	0	42	1.9	0.2	989	0	40	0	7.7	0.5
USA	165	1	1	1.1	0.0	135	0	4	0	6.8	1.5
VIR	215	1	4	1.7	0.0	216	0	5	0	8.0	0.4
VPB	24	0	4	2.9	1.0	25	0	4	0	13.1	0.2
WOA	86	0	6	1.6	0.2	82	0	16	0	12.8	0.7
9VS	20	0	0	1.4	0.0	20	0	0	0	3.7	0.3
EU	24552	0	27	1.3	0.2	24552	0	25	0	4.7	0.5
KL	243	0	9	1.4	0.5	243	0	10	0	5.7	1.0
LH	584	0	6	1.4	0.8	581	0	6	0	4.4	0.8
SA	20	0	100	2.3	1.6	20	0	20	0	4.7	0.8
TN	22	0	18	2.0	0.8	22	0	23	0	9.8	3.3
N	642	1	7	1.9	0.4	629	0	8	0	7.6	0.8
US ACARS	46153	6	48	1.3	0.2	46153	0	44	0	5.0	0.6

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :100 hPa.

Element monitored :GEOPOTENTIAL HEIGHT in metres

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:SD :SD of difference of observations from background values at level shown excluding those with gross errors.

:BIAS :Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
CEWO	12	Z	100	1	0	0.0	16.0	16.0
DASAPX	00	Z	100	1	0	0.0	39.0	39.0
DASAPX	12	Z	100	1	0	0.0	24.0	24.0
DASAP1	12	Z	100	4	0	18.9	27.3	19.8
DASAP3	12	Z	100	2	0	8.5	20.4	18.5
DBBH	12	Z	100	17	0	11.6	45.9	44.4
DBLK	12	Z	100	3	0	3.6	30.2	30.0
DDWW	12	Z	100	2	0	7.5	43.2	42.5
ELML7	00	Z	100	16	0	59.7	62.2	17.4
ELML7	12	Z	100	17	0	13.9	40.5	38.0
FNOR	00	Z	100	11	0	23.6	24.3	6.1
FNOR	12	Z	100	8	0	20.7	21.1	4.0
FNOU	00	Z	100	7	0	8.2	9.6	5.0
FNOU	12	Z	100	6	0	16.7	20.5	11.8
FNPH	00	Z	100	6	0	13.4	13.5	-1.5
FNPH	12	Z	100	5	0	17.3	17.4	2.0
FNRS	00	Z	100	11	0	16.0	16.1	0.9
FNRS	12	Z	100	8	0	24.0	25.9	-9.6
LDWR	00	Z	100	29	0	6.4	17.0	15.7
LDWR	12	Z	100	29	0	9.3	12.0	7.5
OVYA2	00	Z	100	1	0	0.0	19.0	19.0
OVYA2	12	Z	100	1	0	0.0	18.0	18.0
OXYH2	00	Z	100	6	0	6.0	23.9	23.2
OXYH2	12	Z	100	7	0	12.6	23.6	20.0
SWJS	00	Z	100	6	0	8.1	43.3	42.5
SWJS	12	Z	100	7	0	6.0	33.8	33.3
V2XO	00	Z	100	6	0	15.1	42.3	39.5
V2XO	12	Z	100	5	0	24.0	43.3	36.0
WPKD	00	Z	100	5	1	10.8	28.7	26.6
WPKD	12	Z	100	6	0	9.9	38.3	37.0
ZCBP6	00	Z	100	6	0	11.4	21.3	18.0
ZCBP6	12	Z	100	8	0	32.8	47.6	34.5
03953	00	Z	100	28	0	11.3	34.5	32.6
03953	12	Z	100	30	0	16.2	42.2	38.9
04018	00	Z	100	28	0	11.7	30.4	28.1
04018	12	Z	100	30	0	19.5	28.1	20.2
04220	00	Z	100	28	1	6.5	20.0	18.9
04220	12	Z	100	30	0	6.7	21.8	20.7
04270	00	Z	100	29	0	20.7	22.5	8.9
04270	12	Z	100	29	0	13.1	16.3	9.8
04339	00	Z	100	29	0	7.2	25.7	24.7
04339	12	Z	100	30	0	22.1	30.9	21.7
04360	00	Z	100	29	0	12.6	18.8	13.9
04360	12	Z	100	30	0	9.0	17.9	15.5
08001	00	Z	100	22	0	30.0	30.8	7.0
08001	12	Z	100	24	0	23.2	25.9	11.5
08508	12	Z	100	28	0	14.8	44.7	42.1
08522	00	Z	100	29	0	9.0	40.0	39.0
08522	12	Z	100	28	0	11.1	37.7	36.0
08594	12	Z	100	6	0	4.7	22.7	22.2
60020	00	Z	100	28	0	12.2	43.8	42.0
60020	12	Z	100	27	0	17.7	38.1	33.8
71600	00	Z	100	29	0	13.9	19.4	13.4
71600	12	Z	100	30	0	15.2	25.8	20.9
72201	00	Z	100	28	0	13.1	55.1	53.5
72201	12	Z	100	28	0	16.5	55.7	53.3
72402	00	Z	100	28	0	16.4	71.1	69.1
72402	12	Z	100	30	0	13.8	72.9	71.6
74494	00	Z	100	28	0	9.2	29.6	28.1
74494	12	Z	100	26	0	10.2	19.5	16.6
78016	00	Z	100	28	0	18.1	37.1	32.4
78016	12	Z	100	30	0	16.9	37.7	33.7

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
CEWO	12	Z	500	1	0	0.0	11.0	11.0
DASAPX	00	Z	500	1	0	0.0	0.0	0.0
DASAPX	12	Z	500	1	0	0.0	9.0	9.0
DASAP1	12	Z	500	4	0	5.8	6.4	2.8
DASAP3	12	Z	500	2	0	1.5	6.7	6.5
DBBH	12	Z	500	17	0	7.7	10.3	6.9
DBLK	12	Z	500	3	0	5.9	11.6	10.0
DDWW	12	Z	500	2	0	4.0	11.7	11.0
ELML7	00	Z	500	16	0	6.7	7.6	3.5
ELML7	12	Z	500	17	0	6.9	9.7	6.8
FNOR	00	Z	500	13	0	11.6	11.9	2.5
FNOR	12	Z	500	9	0	12.8	13.0	2.3
FNOU	00	Z	500	7	0	7.9	10.7	-7.1
FNOU	12	Z	500	8	1	9.9	12.2	7.1
FNPH	00	Z	500	6	0	6.3	8.1	-5.2
FNPH	12	Z	500	5	0	8.7	8.8	1.8
FNRS	00	Z	500	14	0	8.0	8.6	-3.3
FNRS	12	Z	500	12	0	11.1	12.2	-5.0
LDWR	00	Z	500	29	0	10.0	10.5	3.1
LDWR	12	Z	500	29	0	8.2	8.2	0.8
OVYA2	00	Z	500	1	0	0.0	13.0	13.0
OVYA2	12	Z	500	1	0	0.0	5.0	5.0
OXYH2	00	Z	500	6	0	14.2	17.8	10.8
OXYH2	12	Z	500	7	0	15.5	16.3	5.0
SWJS	00	Z	500	6	0	8.5	18.2	16.2
SWJS	12	Z	500	8	0	3.3	12.6	12.1
V2XO	00	Z	500	6	0	6.8	20.5	19.3
V2XO	12	Z	500	7	0	12.4	19.8	15.4
WPKD	00	Z	500	5	1	9.7	12.4	7.8
WPKD	12	Z	500	6	0	12.4	21.6	17.7
ZCBP6	00	Z	500	7	0	8.4	9.2	3.7
ZCBP6	12	Z	500	8	0	19.4	21.6	9.6
03953	00	Z	500	29	0	8.9	13.9	10.7
03953	12	Z	500	30	0	8.5	17.8	15.6
04018	00	Z	500	29	0	6.3	15.8	14.5
04018	12	Z	500	30	0	15.9	19.9	11.9
04220	00	Z	500	28	1	9.3	12.7	8.6
04220	12	Z	500	30	0	8.1	11.1	7.5
04270	00	Z	500	29	0	17.0	19.8	10.2
04270	12	Z	500	29	0	7.4	9.9	6.6
04339	00	Z	500	29	0	6.5	17.5	16.2
04339	12	Z	500	29	1	6.2	16.9	15.7
04360	00	Z	500	29	0	12.7	14.4	6.8
04360	12	Z	500	30	0	6.9	9.2	6.2
08001	00	Z	500	25	0	14.0	15.0	-5.4
08001	12	Z	500	24	0	12.3	12.3	0.5
08508	12	Z	500	28	0	6.8	10.9	8.5
08522	00	Z	500	29	0	7.0	9.7	6.7
08522	12	Z	500	29	0	8.3	12.1	8.8
08594	12	Z	500	6	0	6.2	10.5	-8.5
60020	00	Z	500	28	0	8.6	10.6	6.3
60020	12	Z	500	27	0	11.2	15.4	10.6
71600	00	Z	500	29	0	10.4	10.4	-1.0
71600	12	Z	500	30	0	11.6	14.0	7.7
72201	00	Z	500	28	0	4.8	12.6	11.6
72201	12	Z	500	28	0	6.1	9.4	7.1
72402	00	Z	500	29	0	6.7	12.8	10.9
72402	12	Z	500	30	0	7.1	12.4	10.2
74494	00	Z	500	28	0	5.1	7.6	5.6
74494	12	Z	500	27	0	5.8	8.3	5.9
78016	00	Z	500	28	1	17.7	19.9	9.1
78016	12	Z	500	30	0	6.7	16.1	14.6

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
CEWO	12	V	100	1	0	0	6.4	4.7	4.4
DASAPX	00	V	100	1	0	0	0.6	0.3	0.5
DASAPX	12	V	100	1	0	0	3.1	3.0	0.8
DASAP1	12	V	100	4	0	0	2.0	0.5	-0.9
DASAP3	12	V	100	2	0	0	2.7	0.7	-2.1
DBBH	12	V	100	15	0	0	6.3	0.5	-0.7
DBLK	12	V	100	3	0	0	1.6	0.8	-0.6
DDWW	12	V	100	2	0	0	3.9	1.8	-1.3
ELML7	00	V	100	16	0	0	6.2	0.6	-0.5
ELML7	12	V	100	16	0	0	4.5	-0.8	-0.1
FNOR	00	V	100	11	0	0	4.0	1.0	0.6
FNOR	12	V	100	8	0	0	3.9	0.6	1.4
FNOU	00	V	100	7	0	0	4.0	-1.5	-1.1
FNOU	12	V	100	6	0	0	4.9	-2.7	1.4
FNPH	00	V	100	6	0	0	4.5	0.7	-0.2
FNPH	12	V	100	5	0	0	3.5	-0.1	0.8
FNRS	00	V	100	12	0	0	3.6	0.1	0.2
FNRS	12	V	100	8	0	0	3.3	0.1	1.2
LDWR	00	V	100	29	0	0	2.6	-0.3	0.5
LDWR	12	V	100	29	0	0	2.5	-0.3	0.3
OVYA2	00	V	100	1	0	0	2.4	-2.2	0.8
OVYA2	12	V	100	1	0	0	3.7	3.6	-0.7
OXYH2	00	V	100	5	0	20	7.7	2.5	4.0
OXYH2	12	V	100	7	0	0	2.2	0.0	-1.0
SWJS	00	V	100	6	0	0	4.2	-1.2	1.8
SWJS	12	V	100	7	0	0	5.7	2.3	0.2
V2XO	00	V	100	5	0	0	2.2	0.2	-0.8
V2XO	12	V	100	4	0	0	3.4	0.5	1.1
WPKD	00	V	100	5	0	0	4.0	0.3	1.6
WPKD	12	V	100	5	0	0	2.8	0.2	-1.6
ZCBP6	00	V	100	5	0	0	3.6	-0.2	0.4
ZCBP6	12	V	100	4	0	0	2.8	1.1	-0.1
03953	00	V	100	28	0	3	4.3	0.3	1.1
03953	12	V	100	30	0	0	2.6	0.7	0.2
04018	00	V	100	28	0	0	2.3	0.1	-0.3
04018	12	V	100	30	0	0	2.3	1.0	0.2
04220	00	V	100	28	0	0	2.3	-0.7	0.2
04220	12	V	100	30	0	0	2.9	0.0	1.0
04270	00	V	100	29	0	0	3.2	0.3	0.9
04270	12	V	100	29	0	0	3.0	-0.3	0.8
04339	00	V	100	21	0	0	4.1	0.8	-1.0
04339	12	V	100	28	0	0	3.9	-1.1	1.1
04360	00	V	100	29	0	0	2.6	-0.6	0.4
04360	12	V	100	29	0	0	2.3	-0.4	0.5
08001	00	V	100	20	0	0	5.1	1.2	1.3
08001	12	V	100	22	0	0	4.5	0.0	-0.6
08508	12	V	100	21	0	0	5.0	-1.0	1.3
08522	00	V	100	27	0	0	4.1	0.2	-1.2
08522	12	V	100	26	0	0	4.5	-0.6	1.0
08594	12	V	100	6	0	100	3.2	-1.3	-1.5
60020	00	V	100	26	0	0	5.4	-2.6	-0.4
60020	12	V	100	25	0	0	5.3	-1.3	0.5
71600	00	V	100	29	0	0	3.6	-0.2	0.3
71600	12	V	100	30	0	0	3.9	0.1	0.8
72201	00	V	100	28	0	0	3.5	0.2	-1.0
72201	12	V	100	28	0	0	4.1	-0.7	-0.8
72402	00	V	100	27	0	0	4.0	-0.1	1.3
72402	12	V	100	30	0	0	4.3	-0.2	0.1
74494	00	V	100	28	0	100	3.0	0.1	0.4
74494	12	V	100	26	0	100	2.6	0.0	-0.5
78016	00	V	100	27	0	0	4.8	-0.7	0.7
78016	12	V	100	30	0	0	3.3	0.6	0.4

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: June 2002

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from selected radiosonde TEMPs.

Area monitored :0°N - 90°N, 100°W - 40°E

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :00, 12 UTC.

Level monitored :500 hPa.

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored :NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:UBIAS,VBIAS: Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
CEWO	12	V	500	1	0	0	2.0	-0.5	-1.9
DASAPX	00	V	500	1	0	0	2.0	0.3	2.0
DASAPX	12	V	500	1	0	0	1.4	1.4	0.3
DASAP1	12	V	500	4	0	0	2.5	1.2	1.1
DASAP3	12	V	500	2	0	0	1.5	0.0	0.6
DBBH	12	V	500	14	0	0	3.3	0.3	0.6
DBLK	12	V	500	3	0	0	6.3	0.1	-4.1
DDWW	12	V	500	2	0	0	2.5	1.8	1.1
ELML7	00	V	500	16	0	0	2.5	0.3	0.2
ELML7	12	V	500	16	0	0	2.9	-0.5	0.1
FNOR	00	V	500	13	0	0	3.6	0.5	0.4
FNOR	12	V	500	9	0	0	4.9	-0.9	-0.3
FNOU	00	V	500	7	0	0	2.7	-1.4	-0.7
FNOU	12	V	500	9	0	0	4.0	-0.2	0.0
FNPH	00	V	500	6	0	0	3.2	1.1	0.6
FNPH	12	V	500	5	0	0	3.2	-0.5	-0.5
FNRS	00	V	500	15	0	0	4.0	-0.6	0.1
FNRS	12	V	500	12	0	0	4.7	-1.1	1.8
LDWR	00	V	500	29	0	0	3.1	-1.0	-1.0
LDWR	12	V	500	29	0	0	2.1	-0.1	-0.9
OVYA2	00	V	500	1	0	0	7.1	-6.3	-3.4
OVYA2	12	V	500	1	0	0	5.2	0.4	5.2
OXYH2	00	V	500	6	0	16	8.8	1.9	-1.0
OXYH2	12	V	500	7	0	0	4.4	-2.8	0.7
SWJS	00	V	500	6	0	0	4.1	0.4	-0.3
SWJS	12	V	500	8	0	0	4.9	0.9	-1.3
V2XO	00	V	500	6	0	0	3.8	1.2	0.0
V2XO	12	V	500	5	0	0	6.5	2.2	3.1
WPKD	00	V	500	5	0	0	1.6	-0.5	0.1
WPKD	12	V	500	5	0	0	2.7	1.9	-0.2
ZCBP6	00	V	500	4	0	0	2.2	-0.2	-0.1
ZCBP6	12	V	500	3	0	0	2.4	-1.3	-0.6
03953	00	V	500	29	0	0	5.0	0.1	0.1
03953	12	V	500	30	0	3	5.6	0.6	-0.3
04018	00	V	500	29	0	0	3.1	-0.3	-0.4
04018	12	V	500	30	0	0	2.9	-0.3	0.1
04220	00	V	500	28	0	0	3.7	-1.2	-0.2
04220	12	V	500	30	0	0	3.2	0.2	-0.2
04270	00	V	500	28	0	0	4.7	-0.5	-0.3
04270	12	V	500	29	0	0	3.2	-0.4	0.3
04339	00	V	500	29	0	0	3.7	-0.8	0.0
04339	12	V	500	30	0	0	4.1	-0.7	-0.6
04360	00	V	500	29	0	0	4.0	-1.0	-0.3
04360	12	V	500	30	0	0	4.0	0.9	0.3
08001	00	V	500	24	0	0	4.0	-0.5	-0.6
08001	12	V	500	24	0	0	4.1	-0.6	-0.9
08508	12	V	500	21	0	0	2.9	-0.3	-0.2
08522	00	V	500	29	0	0	3.2	0.4	0.2
08522	12	V	500	29	0	0	3.8	0.2	0.6
08594	12	V	500	6	0	100	5.3	-1.8	-1.6
60020	00	V	500	28	0	0	3.6	-0.6	0.0
60020	12	V	500	26	0	0	3.6	0.2	0.2
71600	00	V	500	29	0	0	3.6	-0.1	-0.5
71600	12	V	500	30	0	3	5.1	0.8	-0.8
72201	00	V	500	28	0	0	3.4	0.1	-0.3
72201	12	V	500	28	0	0	3.5	-1.0	-0.6
72402	00	V	500	29	0	0	3.2	0.4	-0.4
72402	12	V	500	30	0	0	2.8	-0.1	-1.0
74494	00	V	500	28	0	100	2.7	-0.4	0.5
74494	12	V	500	27	0	100	3.2	-0.4	1.2
78016	00	V	500	29	0	0	3.0	-0.7	0.6
78016	12	V	500	30	0	0	3.1	-0.2	0.9

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45